FAMILIAR

# FLOWERING TREES IN INDIA

IDA COLTHURST

WITH
SIXTY-ONE ILLUSTRATIONS

# FAMILIAR FLOWERING TREES IN INDIA

BY

IDA COLTHURST, F.H.S., F.Z.S.

WITH SIXTY-ONE ILLUSTRATIONS FROM PHOTOGRAPHS IN COLOUR AND HALF-TONE

SECOND EDITION
REVISED BY THE AUTHOR



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TO

C. L. E. C.

# PREFACE TO SECOND EDITION

This book is designed to furnish popular descriptions and illustrations of the most familiar flowering trees of India, so that those having no knowledge of even the rudiments of Botany and yet seeking acquaintance with the trees may be able to recognise them with little difficulty. The present second edition has been revised and entirely re-set.

In India tree-lore is fraught with very special interest, for apart from the diverse varieties and their ornamental bloom, their wonderful industrial and economic utility and their medicinal value, so many of them enter into the religious ceremonies of the people and form part of the ancient mythology of this vast land.

Since pictures unquestionably provide the most direct and definite means of identification, the sixty-four illustrations in colour and half-tone are perhaps the most useful and not the least attractive feature of the book.

The arrangement accords with the natural classification of the vegetable kingdom, and includes scientific, popular and vernacular names of the trees, their economic and medicinal uses, their association with religion and legend, and the range and locality where each tree occurs. Technical terms and scientific

language have been avoided as far as possible, and only those in common use for descriptive purposes have been employed.

Naturally, tribute has been laid to such well-known authorities as Sir Diettrich Brandis, Mr. U. Kanjilal, Mr. Kurz, and Dr. Watt, to whom I wish to express full acknowledgment. The vernacular names are strictly in accordance with their respective books. I am also very grateful to the Editors of *The Statesman* and the *Times of India Illustrated Weekly* for so kindly permitting the re-appearance of my articles and illustrations which were published by them from time to time.

Travellers to the Himalayas and residents in those parts may be interested to know that I have sufficient material for a companion book on Himalayan arboreal, shrub and herbal flora, including some Sikkim orchids, with photographs and sketches in colour. If published, this material will make a book about the same price and size as *Familiar Flowering Trees of India.* For further particulars please apply to my publishers.

IDA COLTHURST.

Calcutta, 1937.

# PUBLISHERS' NOTE TO SECOND EDITION

AMONG those who helped to popularise and advance the sales of the first edition of this book were certain leaders of the Boy Scout and Girl Guide Movements in India, from whence a suggestion came that the younger generation of wayfarers would welcome a cheaper edition. On the other hand, the author had thought of enlarging the book. In the end it was deemed preferable to produce a cheaper edition of the original book, and to keep the new material mentioned in the author's preface for another and similar book on *The Flora of the Himalayas*.

A prospectus of this proposed companion volume will be issued in due course.

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Calcutta, 1937.

# FAMILIAR FLOWERING TREES IN INDIA

# CONTENTS.

CONTENTS—*contd.*

CONTENTS—*contd.*

CONTENTS—*concld.*

# ILLUSTRATIONS.

## COLOURED.

IT is in the first quarter of the year that Flora parades all the pomp of her Empire in India. And when she appears, it is in a riot of colour, all of a rush with both hands full of beauty, as if to compensate us for the advent of the scorching days she brings in her train, and for the loss of the past cold weather.

Every tree and plant and herb bears a flower, conspicuous or insignificant; but beautiful as each is, Nature seems to have concentrated her supreme art and effort, and expended all the riches of her inexhaustible palette on the tropical trees, which at this time afford an evershifting magnificent panorama in the rapidity of their varied colour changes.

Nevertheless, vegetation out here being practically perennial, there is no season when the allurement of expanding leaf or unfolding flower is not offered us, and almost a midsummer verdure prevails from the beginning to the close of the year.

## MALVACEÆ.

The *Malvaceæ* embrace a large group in the vegetable kingdom, very handsome both in their manner of growth and in their flowers, and of great importance from an economic point of view.

The trees of the order differ greatly in appearance; some are characterised by a straight, strong bole armed with prickles on the bark and heavily buttressed, by alternate leaves more or less divided into finger-like portions radiating from a central point, and by large showy flowers which appear at the end of the cold season when the tree is destitute of foliage, followed

by pods containing a mass of silky white hairs, which unfortunately are wanting in the useful property of spinning into a strong thread. Others have simple-lobed leaves and an ovoid capsular fruit. But all agree in a tough, fibrous bark, in yielding an abundance of mucilage, and in being destitute of noxious properties.

(I) BOMBAX MALABARICUM. THE SILK COTTON TREE. Simal (*Hindi*) and Letpan (*Burmese*).

Among the earliest to appear in January and February, decked with blossoms woven in gorgeous tissue, are the Silk Cottons.

Indigenous throughout India and Burma, *Bombax Malabaricum* (the Greek name for cotton) is perhaps the most striking; a tall tree buttressed below to protect it from the heavy leverage of the crown, and burred with woody prickles. At the end of the year, the few remaining large digitate leaves, sere and dry, fall; soon after, "in urgence of sweet life", tiny, black excrescences appear on the bare branches, which swelling into delicate puce-coloured cones show themselves as buds, and later burst to form the massive, crimson chalices of the flowers. It takes much to surpass the witching brilliance of a *Simal* in profligate profusion. The multitude of scarlet stamens and the large purple anthers add to the attractiveness of the bloom, but it is the irresistible and intoxicating nectar within, to which flock tribes of birds, squirrels, bees, etc., to quaff a draught of the sweet liquor, and the air of intense satisfaction with which they elevate their heads after a deep drink is amusing to behold! The chief bird fertilising agents are the common and jungle crows, the red-vented bulbul, the tiny tailor birds, the common



BOMBAX MALABARICUM.

*The Silk Cotton Tree.*

myna, the rosy pastor, babblers, sunbirds and flower peckers—the most efficient, however, is the buffalo myna (*Æthiopsar Fuscus*), because the curious erect tuft of feathers at the base of the bill and above the nostrils acts as a pollen brush. I have known even a palm civet regularly to visit a tree at the foot of my garden. All these are most efficiently securing a very complete cross-fertilisation of the flowers.

On the *Bombax* dwells a small insect which secretes honeydew and covers itself with wax, and the great pods give home to bright orange-red bugs; while the cotton is frequently spoilt by the inroads of the caterpillars of a tiny moth, which lays her eggs in the flower itself, thus easily enabling the larvæ to tunnel the pods. When full fed, they drop to the ground, burrow down and construct little earthen cells for their pupation, emerging the following February to carry on their destructive work.

In Central India the people believe that avenging gods establish a sylvan court among the branches for the punishment of theft and lying.

The grey, darker-streaked wood is used for canoes, planking, toys, etc. The transparent gum which exudes from the bark, and the roots of saplings is used in native medicine and is sold as *Sûpari-Ka-phul*, Supari because the blunt thorns of the tree are eaten by children in place of the nuts of the Areca palm; the sepals of unopened flowers are eaten as a vegetable; the seeds are employed as a nourishing food for cattle; and the cotton considered useless for spinning, the fibres being too smooth to hold together when twisted, merely serves the purpose of stuffing pillows and cushions.

PLATE I



COCHLOSPERMUM GOSSYPIUM.

*The Yellow Silk Cotton.*

In the Terai and up to 3,000 feet, on the flats by rivers and on rather damp plateaux the *Simal* is to be seen at its best. Even big branches strike readily and seeds germinate easily.

### (II) COCHLOSPERMUM GOSSYPIUM. THE TORCHWOOD TREE OF THE YELLOW SILK COTTON. Kûmbi Gooloo (*Vern.*).

The Yellow Silk Cotton, *Cochlospermum Gossypium*, commonly planted near temples and flowering at the same time as the *Simal*, is a much smaller tree, the name is derived from *Cochlo* to twist and *Sperma* a seed in allusion to the form of the seeds which are kidney-shaped.

Being partial to dry soil it does not thrive in Bengal; but in the Satpuras, the blaze of a company of them, with their large pure yellow, almost transparent flowers, tipping the naked branchlets in a golden gleam, is a sight once seen never to be forgotten. There it is known as the Torchwood tree (Vern. *Gooloo*) for it is saturated with a clear, fragrant gum, the *Gum-Hogg* exported from Calcutta to America, not much inferior to *Tragacanth* and employed in bookbinding and marbling paper, from which a prosperous future trade might arise. Even while still green a branch of the tree will burn freely and show a good light.

The smooth bark is particularly affected by fungoid growths, green during the rains, but orange, red and russet in dry weather.

The *Gooloo* is a favourite tree of the Ceylon Buddhists, who offer the flowers in their pagodas. The silk cotton of the pods has a soft but very short

fibre, and as its merits have not yet been definitely determined, at present it is employed merely for stuffing pillows.

(III) ERIODENDRON ANFRACTUOSUM. THE WHITE SILK COTTON. Kapok (*Hindi*) and Elavamparuthi (*Tamil*).

This is the least showy of the cotton trees; it is not indigenous, but has been so successfully introduced from the Malayan Peninsula that it grows now in most parts of India, being particularly plentiful on the Western Coast. In leaf and trunk it is very similar to the Red Cotton, but the staminal column is five-cleft, each branch bearing two or three anthers, whereas that of Bombax is divided into an indefinite number of filaments bearing single anthers; the flowers, white and tassel-like, emerging from a green acorn-shaped calyx, cluster at the ends of the branches in February.

The capsules, which appear later in April, are lined with long silky wool (hence the name *Eriodendron*, wool tree) and furnish the *Kapok* of commerce; *Kapok* is the Dutch-Malayan word for the silky floss and, although too fine and slippery to be employed alone, is used for textile purposes as an admixture. It is a splendid roadside tree, affording good shade and resisting the elements; and if planted more largely might, on account of its economic value, add to the revenues of the country. From the bark a medicinal gum is obtained, the wood is serviceable as a tanning for leather, the seeds yield a good oil and the cake is very beneficial to cattle. In the Dutch Indies the oil is used in cooking and in the manufacture of soap.

7



ERIODENDRON ANFRACTUOSUM.
*The White Silk Cotton.*

The Indians consider all these cottons inferior in quality to the silky coma obtained from the *Madar* (*Calatropis gigantea*), affirming that not only is this cooler, but has a certain sedative effect.

(IV) ADANSONIA DIGITATA. BAOBAB or MONKEY-BREAD TREE. Kulup or Gorak-imli (*Vern.*).

The colossal *Baobab* has been introduced into India by Arab traders from the African Coast, and so is one of our naturalised exotics. The trunk begins with an enormous basal girth, 40 feet not being uncommon in the Central Provinces, and rapidly tapers as it ascends, sending out branches of great size, bearing dense masses of palmate leaves, which however fall off, leaving the huge skeleton bare; the new leaves appear with the buds early in May. Adanson claimed a vast age for some he found in Africa, 5,000 years and more! In India it is a fast growing, long-lived, and most useful tree. The wood is made into rafts and the dry fruit, a large capsule filled with tough stringy fibres something like a gourd, serves as floats for fishing nets. Cordage and paper are made from the bark, and so strong is the former that it has given rise to a popular saying in Bengal, "As secure as an elephant bound with a *Baobab* rope".

The pulp of the fruit has an agreeable and slightly acid taste and is used for preparing a beverage which is supposed to diminish excessive perspiration and keep the blood cool. The wood light, soft and porous is unfortunately subject to the attacks of a fungus



ADANSONIA DIGITATA.
*The Monkey-bread Tree.*

which hollows out the trunk. This fact is taken advantage of by the people in Africa who suspend within the cavities the dead bodies of those whom they desire to mummify; and Livingstone relates how he found some corpses being thus treated.

The massive flowers appearing in June and July are pendulous, the buds hanging like pears from long stalks; the sepaline covering resembles pale-green plush, and the snowy petals, each 4 inches long, are like ivory; from their centre rises a thick white column, whose summit is crowned with many circles of golden filaments and a long curved style. The flower opens at midnight, and the vision of beauty it offers then, repays the time spent in watching its expansion.

The tree is named after Adanson, a great French botanist.

## (V) THESPESIA POPULNEA. THE UMBRELLA TREE OR THE TULIP TREE. Portia (*Tamil*).

*Thespesia Populnea* is one of our evergreen littoral trees, thriving on sandy soil and forming a dense head of foliage, thus earning for itself the name of the Umbrella tree. It is known also as the Tulip tree from a supposed resemblance of the flowers to tulips. They are large and primrose coloured, starred at the base with deep ruby red blotches, passing into a rose-violet when withering. The calyx is a perfect cup and the delicate petals are finely waved, while the central style and filaments are of the pattern of its garden kinsman, the *Hibiscus*. Flowers appear intermittently all the year round.



THESPESIA POPULNEA.
*The Tulip Tree.*

The leaves are large, heart-shaped and pointed, with a beautifully delicate venation, and flecked beneath with minute rusty scales.

*Thespesia* is a most useful tree, all its parts serving some economic purpose; the young inner bark yields a tough fibre, which in Demarara is turned into coffee bags and cigar envelopes; the wood, practically indestructible in water, is requisitioned for boat and house building, and in Ceylon for gunstocks; the unripe fruit yields a yellow dye, and the seeds a deep red oil.

In South India it is called the *Portia* tree, a corruption of *Po-arassu,* the flower king, and is generally planted near temples and as an avenue tree. The name is derived from *Thespesios* meaning divine. *Thespesia* is pollinated chiefly by sunbirds and flower peckers.

## STERCULIACEÆ.

Allied to the *Silk Cottons* and synchronising with them in the season of blooming, sometimes before leafage, are the *Sterculiaceæ,* a family of considerable extent nearly all of whose members are most stately trees.

Like the previous order too, they display a variety of leaf-form, some simple and entirely lobed, others compound resembling an open hand.

The flowers are either axillary or terminal; either large, handsome and fragrant, or small, in close clusters or long drooping panicles, a few of which as the name implies being extremely malodorous.

The fruit is fairly large, woody and with five or fewer radiating divisions opening along the inner edge, and containing albuminous seeds, which in some are edible and in others have the singular property of purifying water. Most of the trees contain a large quantity of mucilage and some yield good gum.

The wood is valueless, but the fibre is strong and serviceable for cordage.

### (I) STERCULIA FŒTIDA.

The order has been unfairly named from *Stercus* meaning stench, because of the evil odour of one of its members *S. Fœtida,* a very tall tree which sheds its bark in ugly patches, and bears flowers, small, ochreous and rusty in colour, bell-shaped and appearing in dense clusters beneath a coronal of new delicately divided leaves; their odour is actually so



STERCULIA FŒTIDA.

repulsive as to prove alluring to flies, but renders their neighbourhood rank and unapproachable to human beings. The fruit is large and woody, and when the follicles burst assumes the shape of a great shamrock; the black seeds within are roasted and much appreciated by the poor; a gum is extracted from them by boiling in water. Flowers and leaves have a medicinal value.

The wood is very light, loose-grained and useless. The tree is found chiefly in Tenasserim, but is easily cultivated in Bengal, etc. It flowers from February to April.

(II) STERCULIA VILLOSA. Udial or Godgudála (*Hindi*) and Shawnee (*Burmese*).

Frequent in India, from the Punjab to the south and extending to Burma and the Andamans, is *Sterculia Villosa.* In the Punjab it is stunted and does not grow higher than ten feet with an ugly twisted trunk; in the eastern Provinces it attains fair height though considerably smaller than *Fœtida,* with deeply lobed leaves crowded at the ends of the branches. It is fairly common in the Terai and in the Lower Hill forests. Losing all its leaves during the cold weather in early February it is a beautiful sight when, stark and naked, it suddenly clothes itself in long tresses of fragrant yellow and purple-centred bloom.

The wood is light and of a pale grey-brown with numerous medullary rays and concentric bands of a dark colour and very large pores—if felled and left in the forest it rots within a year; the seeds readily germinate and the innumerable coppice shoots which sprout from their fall are most difficult to exterminate.



STERCULIA VILLOSA.

The inner bark supplies a valuable fibre employed in making strong, pliable ropes for elephant-hunting, so that in the open forest the tree is threatened with extermination. The method of obtaining the bark is to steep the logs in water for some days, when it comes off in entire large pieces; on the Western Coast these are converted into bags for the conveyance of rice, etc., and also into clothing, while the scraps and narrow strips are used for cordage. The follicle is very large and covered with a hairy substance remarkably like red baize in texture and appearance.

A thin gum, known commercially as *Katila,* exudes from the trunk.

(III) STERCULIA ALATA. Let-kope (*Burmese*) and Muslini (*Sikkim*).

This tree abounds in Burma and in the neighbourhood of Chittagong; also occurs in the Andamans, does very well in Bengal, and often occurs in the Teesta Valley.

It is the most conspicuously tall tree by our roadsides. In Chittagong it is known as *Budda Nari Killa* or Boodh's Coco-nut, on account of the enormous wooden follicles, sometimes 6 and 7 inches in diameter, which hang from long stalks and contain seeds, known in Sylhet as *Toola* and eaten there as a cheap substitute for opium. The leaves are roundish and somewhat heart-shaped, with long stalks, and the flowers which are dull and olive green are redeemed from inconspicuousness by their fragrant lime-like odour. They appear about March.



STERCULIA ALATA.

*Sterculia Urens* (Gūlu) is another of the family very common in Burma, the Central Provinces and the Terai; the flowers appearing in February in very crowded panicles are small and greenish-yellow, and every part is covered with a short, sticky pile. The hand-shaped leaves gather at the ends of the branches. The fruit, hard, red when ripe and covered with bristling stinging hairs, contains dark brown seeds which are roasted and eaten. It yields a gum called *Katila*, which is of the tragacanth or insoluble kind; it gives off acetic acid when exposed to moist air and develops into vinegar when closely bottled.

When the trees are ten years old, they are cut down and the trunk cut up into big pieces, the bark separated and made into a coarse but useful cloth by the poor. The flowers and young leaves have a most disagreeable smell when handled. The wood is very light, and is employed largely for making toys, fancy articles and especially *sitars* (Indian guitars).

(IV) STERCULIA COLORATA. Wet-sha (*Burmese*), Samarri (*Hindi*) and Bhaikoi (*Bombay*).

*Sterculia Colorata* is a leaf-shedding tree, and for a season is absolutely devoid of any verdure. In March, while still bare, it is transformed into the semblance of some huge coralline growth, for it is covered with erect, lateral as well as terminal, short-stalked panicles of bright orange-red blossoms and buds, each about an inch long, a most attractive sight especially when several stand together in the forest. The leaves, which appear clustering at the ends of the branches shortly after the bloom, are broadly lobed, each lobe tapering to a point, rather thin and covered



STERCULIA COLORATA.

PLATE II



PTEROSPERMUM ACERIFOLIUM.

*The Kanak Champa.*

beneath with short hairs. The fruit is long-stalked, and opens out flat (exactly like the expanding of a leaf) before the seeds ripen, thus displaying its structure in a way that is of great use to botanical students. It is pink outside, yellowish with two bean-like seeds inside.

The bark, broadly fissured and wrinkled, peels off like paper and is converted into ropes; and the twigs and leaves are employed as cattle fodder. Trees are found from the foot of the Himalayas eastward to Burma and southward through the Central Provinces to the Peninsula. The Singhalese admire it greatly and have composed many songs in honour of its extraordinary and beautiful bloom.

(V) PTEROSPERMUM ACERIFOLIUM. Kanak Champa (*Bengal*), Karnikára or Mayeng (*Hindi*), Tong-pet-woon (*Burmese*) and Hattipilai (*Sikkim*).

The *Pterospermums* are among our best trees, growing quickly in damp and even swampy situations, large and shady. They extend from the banks of the Jumna right through Bengal to Burma and the Andamans, but are largely cultivated throughout India. *P. Acerifolium* is an evergreen tree; the leaves are unfolded and first appear as tiny discs, brown and velvety, which daily increase marginally until they are sometimes 10 inches across and 12 inches long, the largest leaves being on the youngest shoots. They are round and very slightly lobed, tough and thick, a deep green above, pubescent and deeply veined beneath and so grey that in windy weather, especially when seen in the lurid gloom of a thunder-storm, they appear pallid.

The flower buds, arising in twos and threes from the axils of the leaves, are large, rusty-green, leathery and pod-shaped; on splitting into five long velvety sepals, they reflex and display beautiful pure white twisted and imbricate petals, delicate as the finest silk and enclosing a lovely tassel of ivory filaments. The fragrance, due to small, brown, hairy glands which cover the succulent sepals, lasts for a long time even when these are dry.

The fruit is an oblong woody capsule, five-angled and covered by a dark brown scurfy coat of short hairs which soon drop off.

The leaves serve as fodder for cattle and are laid on roofs underneath thatch; their hairy down is believed to stop bleeding and a plaster of the fleshy sepals is considered an infallible cure in mumps and all glandular swellings. Also, because of their lasting fragrance, they may be recommended to the attention of perfume makers. Burma produces many other beautiful *Pterospermums*, all with large sweetly scented white flowers: some of these are *P. Cinnamomeum*, *P. Javanicum*, *P. Lancæfolium* the *Ban-Killa* of Eastern Bengal, and *P. Aceroides*. Unfortunately the beauty of all their flowers is marred by the shortness of the stalks.

## (VI) KLEINHOVIA HOSPITA.

A genus of the same family *Kleinhovia Hospita*, named after Kleinhoff, a Dutch botanical expert, is a native of the Malayan Peninsula but now very widely spread in India, wherever the country is fairly damp. It is a medium sized tree, with heart-shaped leaves,



KLEINHOVIA HOSPITA.

and for nine months in the year looks as if it were swathed in gossamer, on account of the delicate tracery of last year's flower stalks; but in July, it is covered with terminal panicles of small pink flowers, with a five-parted calyx and five narrow unequal petals which fade and fall off early. The tree blooms intermittently till October, when, interspersed among the flowers, will be recognised the top-shaped capsular green fruit with five cells each having a single seed. These curious fruits alone will help one to identify the tree.

The trunk is deeply ribbed, and sends up numberless shoots from the base, and cuttings of these shoots will readily root in sand. The crushed leaves are said to smell "like violets hidden in the grass".

Altogether *Kleinhovia,* on account of its evergreen character and longer succession of beauty than many of greater pretensions, is a desirable and handsome tree for avenue planting.

# LEGUMINOSÆ.

The pod-bearing family is largely represented and of great importance in India, since the members supply excellent timber, useful gum, good oil, edible fruits and have valuable medicinal properties. To describe all the varieties would fill a book, for they run into hundreds, so I present only the best known of the order.

The trees usually have alternate compound leaves and regular or irregular flowers, with one character constant, viz., the position of the odd sepal, which is always anterior.

## (1) BROWNEA COCCINEA.

The *Browneas*, named after a Dr. Browne who wrote a history of the West Indies, are not Indian trees, but very successful exotics introduced from Central America and Trinidad, and are becoming fairly common and very popular everywhere, not only because of their evergreen appearance, but for the great heads of blossom, rose-coloured and crimson.

The pinnate leaves, a foot and a half long with from four to twelve pairs of glossy leaflets, seem never to be shed and are very similar to those of our beautiful *Amherstia*.

If you examine an opening leaf-bud you will find a most interesting arrangement. There are a few scales, the outer small, tough and stunted, but the inner ones so long that they protrude. Inside these are the normal pinnate leaves, mixed with long filiform



BROWNEA COCCINEA.

modified appendages. On emerging, the leaves hang colourless and limp for several days with leaflets rolled from either edge to the centre rib, and it is only when they gain colour and expand completely that they rise up and stand erect. The outer scales drop off very soon after their life's purpose—the covering of the baby leaves—is attained; their extreme toughness is nature's plan for rendering them waterproof, and particularly protective to the tender structures they cover.

The flowers, commonly crimson-scarlet and short-stalked, are borne in great terminal heads spiked with yellow filaments and so heavy that they weigh the branches down.

Moonlight nights discover *Browneas* in all their beauty, for during the heat of the day the leaves droop and hide the flower clusters, but when the coolness of night arrives, they raise themselves and expose the rhododendron-like bloom. The pods are compressed and scimitar-shaped, covered with short rusty hairs.

*Browneas* are easily propagated by cuttings taken from ripe wood and planted in sand.

(II) AMHERSTIA NOBILIS. The Tree of Heaven. Thawko or So-Ka (*Burmese*).

*Amherstia Nobilis* is the only species and has been called after Lady Amherst, a zealous promoter of Botany. The leaves are very similar to those of *Brownea*, pinnate, and when young of a pale purple colour, which is believed in some mysterious way to protect the tender tissues from the injurious effect of



AMHERSTIA NOBILIS.
*The Tree of Heaven.*

strong light and intense heat when the tropical sun is powerful. In fact, it is believed that they absorb rays which compose the yellow green part of the spectrum. This idiosyncrasy is also observed in the mango and in a few other trees.

When in flower the *Amherstia*, popularly called "The Tree of Heaven", is considered "one of the most superb objects imaginable, unrivalled in India or in any other part of the world". The flowers appearing in February and March are large, the waved petals crimson with the three lower ones yellow towards the apex, arranged on slender red stems in long drooping racemes at the ends of the branchlets, just like an immense candelabrum. Unfortunately they are scentless, but are nevertheless loved by the gay Burmese who put them in their hair and offer them at the images of Buddha.

The tree was discovered by Wallich at Trochla, a village on the Salwen.

The Burmese propagate the tree by removing a ring of bark from a young branch, and including the wound in the split stem of an earth-filled bamboo, they keep it moist until rootlets appear which are strong enough to plant out separately.

(III) ERYTHRINA INDICA. THE CORAL TREE. Pangra (*Hindi*), Penglay-kathit (*Burmese*) and Fullidha (*Sikkim*).

This tree, flowering in March and leafless during the hot season, is frequent in all our beach forests, and occurs inland where it is suspected brine wells or limestone exist in the vicinity. It has a very rapid



ERYTHRINA INDICA.
*The Coral Tree.*

growth, and is armed with prickles to the fourth year; unfortunately in Bengal it is commonly seen in a dwarfed condition, as the people find it convenient for quick growing hedges, and for supporting the betel and black pepper vine. The broad ovate leaflets appear in April and are arranged in threes, each with a long stalk. The flowers are of a dazzling scarlet in dense clusters imbricating closely, and out of each issues such a crowd of long purple filaments, that from a little distance the spike looks like a violet brush. They must conceal brimming wells of nectar for, from sunrise to noon and then again in the evening, they are haunted by bird and insect world alike, providing generous and accessible entertainment to crows, mynas, jungle babblers, white-eyes, green bulbuls and a host of other avian pilferers; the insect frequenters are wasps, butterflies and especially bees. All these in return assist by pollinating the flowers for, alighting on the scarlet signboards, they must reach inwards over the filaments to get at the honey store and thus become covered beneath with the golden pollen, part of which is conveyed to the next unfertilised cluster of flowers visited.

In Ceylon the leaves are eaten in curry, and the wood is specially valued by the Assamese for purposes of cremation, the belief being that the quick burning of the soft structure ensures the spirit good health. It is surprising how many superstitions are attached to trees in this connection; those full of sap are shunned for fear of causing the departed sorrowful tears; the *Simal* brings bad luck; and those with hairy leaves are left alone, since they may cause irritation and disturb the rest of the departed!

The pods are nearly a foot long, cylindrical, curved and so contracted at regular intervals that they resemble a necklace of beads. The seeds are large and purple.

The wood is called *mochi* wood in Madras and, as it neither warps nor splits when worked and varnishes well, is converted into toys, etc., in fact most of the Indian lacquered work is made of it. The tree is said to afford home to the lac insect.

Any branch or even twig will strike root readily and felled stems send out shoots which root at once, consequently the tree is very useful as a "shade" tree on coffee plantations and still more so as a "nitrogen assimilator", i.e., in the nitrification of the soil.

(IV) SARACA INDICA. Jonesia Asoca. Asōk (*Hindi*), Vanjula (*Sans.*) and Thaw-ka-po (*Burmese*).

The genus is really tropical American and takes its name from *Sarac*, the Indian name in the New World, but *Jonesia Asoca* or *Saraca Indica* is indigenous and is a favourite tree all over India. In form of leaf, droop and colour of the young ones, it has the same appearance as *Amherstia*.

The first rush of bloom is in February, when the groups of small orange and scarlet flowers appear so suddenly and so closely all over the twigs and branches, that the tree almost looks as if it had broken out in some exanthematous fever! After this it blooms intermittently until the rains are well advanced. The flowers, about an inch long, have no petals, but are



SARACA INDICA.
*Jonesia Asoca.*

constructed by a tubular calyx, two rounded bracts and a four-parted petal-like border, out of which 3 to 9 deeply crimson stamens protrude. Like so many other of our Indian flowers, their tone intensifies with age; their youth is ochreous, and their maturity vivid scarlet; a change not due to decadence, but apparently brought about by exposure to the sun's rays, since flowers always shaded remain yellow. They are deliciously fragrant at night, and the common Indian belief is that the tree only flowers where a woman's foot has trod! Hence Sir Edwin Arnold's

"As pale Asōka buds
Wait for a woman's foot!"

an assertion quite unsupported by mythology. However, the trees are most sacred to Buddhists and Hindus alike, who plant them around their temples and employ the flowers as votive offerings to the Gods.

The *Asōk* is one of the five trees which enter into the Holy *Punchabati*, the others being the *Pipal,* the *Banyan,* the *Bael* (*Aegle Marmelos*) and the *Amalāki* (*Phyllanthus Emblica*).

The eve of *Basānti Puja* is set apart for its special worship, when orthodox Hindu ladies drink the water in which have been immersed six *Asōk* blossoms, so as to guard their children from grief and trouble, singing at the same time: "O, thou beloved of Shiva, thou, *Asōk* born in the month of the Spring, grieved with sorrow I drink thee, deliver us from distress!"

The leaves of the tree also enter into the "*Naupatrika*", the nine leaves required for the proper celebration of the *Durga Puja.* The others

are the *Plantain, Paddy, Pomegranate, Turmeric, Bael,* two of the *Aroidæ* and *Sesbania ægyptiaca.* Folkard says, "The tree is the symbol of love, and is dedicated to Kama the Indian God of Love—and like the Agnus Castus is believed to have a certain charm in preserving chastity; thus Sita, the wife of Rama, when she was abducted by Ravana, escaped from the caresses of the demon by seeking refuge in a grove of *Asōk*".

The Buddhists revere the tree since under its

"Stately trunk, straight as a temple shaft
With crowns of glossy leaves and fragrant blooms"

Lord Buddha, the teacher of Nirvana and the Law, was born.

(V) BUTEA FRONDOSA. The Parrot Tree or The Flame of the Forest. Dhak or Pālas (*Hindi*) and Pouk-pen (*Burmese*).

*Butea Frondosa* named after John, Earl of Bute, a patron of botany, is a very common tree throughout India and Burma, but particularly thrives on the black soil of Central India and on the saline soil of the Punjab. It is remarkably gregarious and thus planted, is most useful on land under reclamation, though belonging to a family which shows a strong aversion to saline soils.

At ordinary times *Butea Frondosa,* the Parrot tree of the Europeans (from the fancied resemblance of the keel of the flower to a beak) and the *Palasa* of the Hindus, is an unattractive, distorted tree, carrying hard trifoliate leaves which Brahmin bachelors wear to



BUTEA FRONDOSA.
*The Flame of the Forest.*

indicate their absorption in religious study, and which are also used to pour ghee into the sacred fires during the chant of the Mantras. But in February these are shed, and then is the glory of the *Palasa,* for it flaunts a vivid, vermilion riot of bloom, which, as each petal is softly pubescent, shines and shimmers like silver in the sunlight. The olive-green velvety calyces also lend to the general adornment so that the ugly tree is transformed into the beauty of its location.

*Butea Frondosa* has the further advantage of rare utility, the leaves give home to the lac insect, the flowers provide a brilliant if fleeting yellow dye, the ruby-red gum known as *Bengal Kino* is largely used in tanning operations and in purifying indigo and has a place in the Pharmacopœia of the indigenous medical man; the wood is useless as timber above ground, but under water is useful for piles, well-curbs and water-scoops; as charcoal it has been introduced into the bleaching of morphia and for gunpowder; and even the roots serve a useful purpose as ropes. Furthermore, it has an interesting historical association since surrounding groves of the trees gave name to the village Plassey.

The pods 3 to 4 inches long are pendulous and curved like the blade of a scythe; they are covered with dense soft silvery hairs and contain flat, oval, brown seeds.

The flowers are fertilised by crows, babblers, sunbirds and all mynas but in particular the grey-headed myna.

It is interesting to note that a single tree bearing flowers as golden yellow as the sunflower has been reported as blooming at Manpur in the Central India

Agency in 1918; and yellowish-white flowered varieties have also been seen from time to time in the Central Provinces. The former must indeed be a glorious sight, and it will be interesting to ascertain later if the seeds, which I believe were planted, have flowered true.

(VI) ADENANTHERA PAVONINA. THE RED SANDAL-WOOD. Kuchandana (*Hindi*) and Vāy-kwee (*Burmese*).

The *Adenanthera* is a large tree, with long pinnate leaves, an erect trunk and a rough, dark bark. Skinner has described the heart-wood as of a beautiful red colour streaked with black, turning purple on exposure and resembling Rosewood. The tree is plentiful in Bengal, Burma and South India and extends through the Malayan Peninsula to China, shedding its leaves in the cold season, and early in the new year appearing in fresh verdure and bloom.

But the distinction of the tree lies in the attractiveness and utility of its small scarlet seeds, rather than in its inflorescence, for the latter is merely a stiff spike 4 to 5 inches long, composed of a multitude of tiny, sessile, highly scented cream flowers, each shaped like a little star and furnished with long gland-crested anthers, hence the name *Aden* meaning gland. The flowers appear in March and later are replaced by deep brown pods which, on bursting, assume many contortions and display brilliant red seeds lying on a contrasting silvery surface. This is Nature's device for trading on the inquisitive greed of birds, for they are very securely attached and their coverings are so particularly hard, that their natural dropping would be delayed if the birds did not jerk them out, and carry



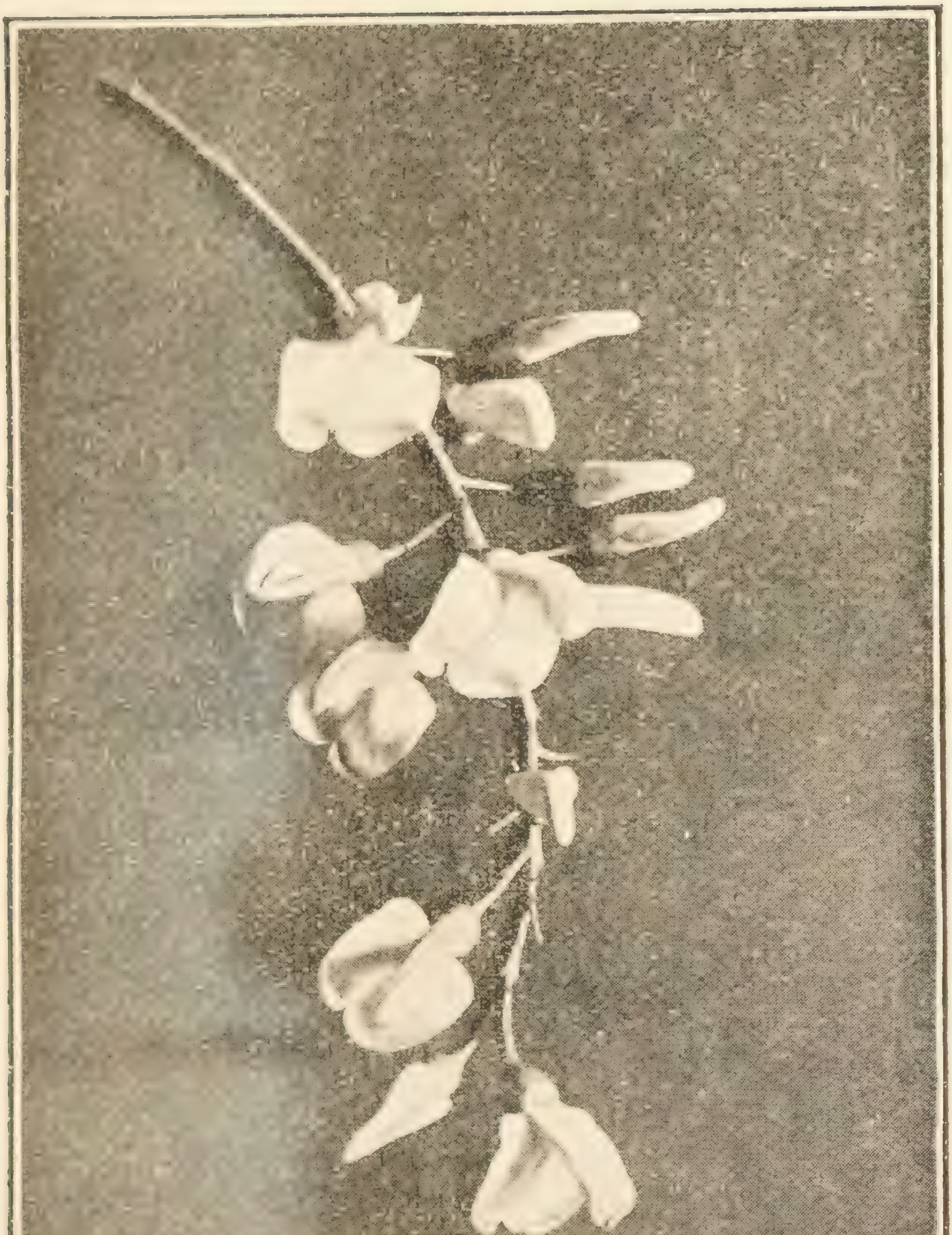
ADENANTHERA PAVONINA.
*The Red Sandal-wood.*

them some distance from the parent tree, where failing to crack their coverings they drop them, thus enabling the species to attack fresh territory. Sometimes oil is expressed from these seeds and they are also pounded and mixed with borax to serve as an adhesive. But it is the Indian jeweller who finds them most useful, either as a ready-to-hand weight, for each seed weighs exactly 4 grs., or in actual jewellery: and it is not so long since a Bond Street merchant set them in gold as rings, brooches and chains, and they became the fashion in London. Their bright colour does not lose by age, but fades on immersion in water and the cotyledons burst apart; consequently the seeds must be bored without any attempt to soften them. The wood, rubbed against a wet stone, gives a red paste which is used by Brahmins for religious forehead marks. All birds assist in spreading the seed.

## (VII) MILLETTIA. The Moulmein Rosewood.

Kway-tanyeng, etc. (*Burmese*).

The *Millettias* are a very beautiful genus of this order, very little known beyond Assam and Burma, for these are the only places where they occur. They are called after a French botanist, J. A. Millet, and are tall forest trees, with pinnate leaves, some evergreen, others leaf-shedding, bearing in great profusion in March and April delicate pendulous racemes of the most daintily tinted flowers, mauve, steel-blue, rose-coloured and lazuli-blue, recalling in their general appearance the beautiful Japanese *Wistaria* to which they are allied on the one hand, and to the *Pongamia* on the other. The flowers of *Millettia,* however, are



MILLETTIA.

*The Moulmein Rosewood.*

never yellow; they have the sepals and petals alike, a broad standard usually reflexed, the keel blunt and incurved. The pods are flat or convex.

The wood is hard and rather heavy and one species supplies the well-known Moulmein Rosewood, yielding also a red resin; it is generally considered valueless and is employed only for cross pieces of harrows, etc.

The roots, and pods which are blackish, smooth and 2 to 4 inches long containing 2 large dark seeds, are in some places employed in poisoning fish, or rather intoxicating them, so that they float unconscious upon the surface of the water and are thus easily captured, and on recovery serve as useful food.

## (VIII) PITHECOLOBIUM SAMAN. The Rain Tree.

The Monkey's Earring (in allusion to the derivation *Pithecos* ape and *lobos* lobe of the ear).

In exposed places, many trees, by turning away from the prevailing winds, bend and lose their trim symmetry; but the evergreen Rain Tree (*Pithecolobium Saman*), given space to develop, and sure foothold, has enormous power to resist the hurricane, and thus proves very suitable for avenue planting. But when planted in a garden it becomes lazy and shallow rooted, for its rootlets get attracted to the rich manure and water of the flower beds and have a harmful effect on the plants by depriving them of their sustenance. The pinnate leaves have the remarkable quality of not only "sleeping" at night, but of responding to the meteorological conditions of their environment; during full exposure to sunlight, they maintain a complete expansion and



PITHECOLOBIUM SAMAN.
*The Rain Tree.*

afford a dense shade, but at night or during rain, the stalks droop and the leaflets turn round so that they face sideways; this is because they own a *pulvinus*, a thickening of the base so flexible that the leaf may move as if on a hinge.

The popular name is due to the curious shower of moisture which occasionally drenches all beneath it, an exudation from thousands of minute insects. Assuming this to be a property of the tree itself, it was largely introduced by seed into the barren, arid parts of Australia, but disappointment resulted for the pluvial tenants had not been imported.

The flowers appear in pink clusters nearly sessile, on heads with long stalks which are fascicled at the ends of the branches; the calyx and corolla are both short and tubular and it is the long rosy filaments which lend character to each blossom.

There are two distinct seasons of blooming, the first in March, the second after the rains, when the tree flushes to a greater degree and is converted into an enormous bouquet. But there is no flower that loses so much of its spectacular charm as this, when removed from its environment; for the effectiveness of the bloom lies in the globular heads of long, densely crowded, stiffly erect filaments, which immediately assume a saddened and bedraggled appearance when the flowers are broken off.

The pod is dark and angular, with many seeds imbedded in a sweet pulp and is considered a useful food in times of scarcity.

(IX) ALBIZZIA LEBBEK. ACACIA LEBBEK OR THE FRY-WOOD TREE. Siris (*Vern.*) and Kokko (*Burmese*).

Closely allied to the Rain Tree and with a similar leafage and fuzzy-headed inflorescence is *Albizzia Lebbek* the *Siris Acacia* of Asia and Africa. The flower-heads appearing in April are spiked with white and green-tipped filaments, and grow in dense clusters all along the branches. Particularly at night, but also in the day-time, they exhale a delightful perfume, and are consequently besieged by honey bees and other insects for their nectar.

It is a large tree, with a spreading crown, but in towns grows to a lower stature. The leaves pinnate, with opposite leaflets very thin and somewhat mottled with grey patches, are lost during the hot weather, when the tree is clad merely in large, straw-coloured pods, whose crisp rustle is supposed to carry a fanciful resemblance to the sound of frying, and is the origin of the name it is known by in some places, *The Fry-wood Tree.*

It is frequent in Bengal, Sikkim where it is sacred to the Buddhists, Burma, the Central Provinces and throughout the South, and is also cultivated in Egypt, Afghanistan and Mesopotamia, which is not surprising since the leaves are so excellent as camel fodder. It is easily raised from seed, and during the first few years the growth is very rapid. The roots are shallow and consequently the tree is believed to have a depressing effect on garden plants if grown in their vicinity and is apt to be upset by storms.



ALBIZZIA LEBBEK.
*The Fry-wood Tree.*

It abounds with sap, and a pellucid gum exudes from the bark which is useful for tanning fishing nets; the wood is durable, works freely and takes a good polish, so is much valued for furniture, wheels, cane crushers, etc., also for building purposes. At one time it was largely exported from the Andamans to Europe as "East Indian Walnut" and was used for cabinet making, picture frames and similar work since it takes a fine polish.

## (X) TAMARINDUS INDICA. Tamarind. Imli (*Hindi*) and Magyee (*Burmese*).

The *Tamarind* (from the Arabic, *tamr,* a ripe date and Hind, India) with its beautiful jade-green fronds of foliage and fleck of creamy, cool-looking flowers is too well known to need much description. Elegant little blossoms issue in loose bunches from the sides of the branches, and nestle in the tender foliage. Each calyx is yellow, the petals are straw-coloured and finely streaked with crimson, and the purple filaments are tipped with golden anthers. In Ceylon the flowers are used as a liver tonic, and all over India the leaves and fruit have a medicinal value.

By a common Indian superstition, dwellers under the tree are supposed to contract leprosy, an idea which has probably arisen from the fact that plants growing, or tents pitched beneath its boughs for any time, rot and are destroyed, since it is full of vegetable acids.

The Burmese have a legend concerning its profusion near Mandalay; they state that the tree produces great heat, and that at one time Mandalay



TAMARINDUS INDICA.

*The Tamarind.*

Plate III



POINCIANA REGIA.

*Gul Mohur.*

was so cold that life there was extremely difficult; on complaining to the King at Amarapoora, he ordered 101 ministers to each plant 101 Tamarind trees; when these grew up, they warmed the city so tremendously, that now the people suffer from the other extreme of temperature! At any rate, though freely cultivated all over Burma, apparently nowhere else is it wild. The Tamarind is also much grown all over India, but in the Central Provinces and S. India it occurs self-sown in waste land delighting in deep alluvial soil. It is believed to have been introduced from Africa, where it is truly indigenous.

The tree is never quite leafless, though the foliage is renewed early in the year, after which the flowers are seen.

The wood is extremely hard to work, but valued and polishes well, so is used for furniture and is excellent in turnery; however the tree is only cut down when past bearing as the fruit is so popular. Some fruits are sour and others sweet and some have a red pulp; they contain Citric, Tartaric and Mallic Acids and are of use in sweet sherbets and in fever decoctions. The seeds too are medicinal and are sometimes eaten, and pounded with gum they serve as a paste which is employed in dressing country made blankets.

(XI) POINCIANA REGIA. GUL MOHUR or THE PEACOCK FLOWER. Sunkesvara. Dodda Ratnagandi (*Tamil*).

This splendid ornamental tree is not a native of this land, but was introduced from Madagascar and named after one of the governors, Monsieur de Poinci.

It is of the easiest culture however, and is therefore plentiful all over India, Burma and Malaya.

The leaves with 8 to 20 pinnæ are handsome in themselves, but drop away during the cold season, and for some weeks after this shedding the trees are extremely unsightly; then, Cinderella-like they almost spontaneously burst into gorgeous scarlet and vermilion masses, bizarre "fountains of flame", tossing their laden branches in every direction and best described by their French name "*Flamboyante*". An avenue of *Gul Mohur*, all in bloom together, is wonderfully effective, but glows too hotly in the intense glare and proves fatiguing to the eye; so much so that one wonders, who indeed, living where they prevail

"Would choose however dear
That spring should revel all the year?"

Even planted singly against the blue of the sky, and toned down by the green of surrounding trees, they appear to me as the very embodiment of the spirit of the East, beautiful but wild-looking and seductive!

The structure of the individual flowers adds to the fantastic appearance of the inflorescence. Five large, clawed petals, delicately waved at the margins, spring from the spaces between each of the thick green sepals; four of these are either a dazzling crimson or a deep orange, while the fifth is streaked and splotched with yellow and white; and ten bristly red filaments stick out from the centre, to far beyond the petals.

An orange variety is common and one of a primrose yellow has been reported from Africa.

*Colvillea Racemosa* has the same superficial appearance, but has not the wealth of bloom of the *Poinciana*, and the bright scarlet flowers grow differently, being set on erect cylindrical racemes about a couple of feet high. It has been named after Sir Charles Colville, once governor of Mauritius, from where it was introduced into India.

Both trees are pollinated chiefly by rose-ringed parakeets and sunbirds.

## (XII) PELTOPHORUM FERRUGINEUM.

This is a fairly evergreen tree, with bipinnate leaves which when young are covered with soft rusty hairs, but develop into a specially beautiful dark green. It has been brought to India either from Brazil or the West Indies, where it is called *Braziletto*. Now it is found all over India and even in the coast forest of the Andamans.

When in bloom *Peltophorum Ferrugineum* has a most *prononcé* appearance, each inflorescence being erect and cone-shaped and rising in tiers, so that the tree is also pyramidal. There is a special magnificence in these massive spires of gilded bloom, tipped with rusty, downy buds; the flowers are most fragrant with yellow petals finely curled and waved, while the wine-coloured pods, and the fern-like deep-green foliage are in themselves an adornment. In the see-saw of public popularity certain trees go up and down; and it is not twenty years since *Peltophorum Ferrugineum* was the tree of the moment in Bombay, and was planted alternating with *Oreodoxa* palms through Hornby



PELTOPHORUM FERRUGINEUM.

Road and other streets: latterly, they have lost their hold of the Western City, but are rising in favour in Calcutta and are becoming quite a beautifully decorative feature of the town.

The wood is too coarse and light to be useful.

## CASSIAS.

(I) CASSIA FISTULA. THE INDIAN LABURNUM or THE PUDDING PIPE TREE. Amāltas (*Hindi*), Gnoo-Kyee (*Burmese*), and Kosrai or Sarrak-konai (*Tamil*).

*Cassia Fistula,* a moderate sized tree, is common throughout the forest tracts in India and Burma. It is very shy of germination and has a slow growth, but once established apparently thrives in any soil.

It is one of our most beautiful trees when in full bloom, with long fragrant pendulous racemes, varying in tint from a pale primrose to golden yellow, and bearing some resemblance to the English Laburnum. It appears with new leaves in March and April among which are interspersed the somewhat irregular flowers, one of the petals being almost like the standard in the pea-flower, and strangely enough imitating it in screening the other parts by turning its back to the wind, a trick blossoms employ to keep the inner and more delicate organs safe.

The leaves are compound, with 4 to 8 pairs of ovate leaflets; the pod is from 1 to 2 feet long, smooth, hard and cylindrical, dark brown when fully ripe and filled with a sweet black pulp and numerous seeds. The pulp is used in medicine and as an ingredient of scented Indian tobacco. The bark is employed in tanning and dyeing and is also a valuable application in skin diseases.



CASSIA FISTULA.
*The Indian Laburnum.*

In Ceylon the flowers are prized as votive offerings in the temples, and in India are converted into a confection which is a valuable febrifuge known as *Gul-Khaub.*

As is well known, animals play a most important part in the spreading of trees and plants, either consciously or unconsciously; the seeds become attached to their coats, or birds swallow them or carry them away fixed by the sticky pulp to their beaks. Professor Troup mentions that *Cassia Fistula* pods are opened by monkeys and jackals for the sweet mass within, and thus the *seeds* are disseminated, when otherwise, they would be destroyed by insects before escaping from the fruit. The seeds of the *Bael* too, would be similarly lost if the fruit was not trampled on by pigs and deer.

Cassias derive their name from the Greek *Kasia* of Dioscorides.

(11) CASSIA GRANDIS, CASSIA NODOSA, CASSIA RENIGERA and CASSIA MARGINATA. PINK CASSIAS. Gnoo-thein or Gnoo-shway (*Burma*).

When not the hint of a leaf is in sight, in early April *Cassia Grandis*, the Horse Cassia, sends up erect, ladder-like racemes of delicate flowers which are more or less yellow according to their degree of sunshine exposure; in the shade they are jaundiced, but in full light a most dainty pink and salmon-colour. The legumes which appear later contain a pulp between the seeds which has a disagreeable smell. The young leaves are of a ruby tint, covered with a silvery pubescence but very soon become smooth and green. The tree is a native of the Caribbean Isles.



CASSIA GRANDIS.
*The Horse Cassia.*

Very ornamental too, and carrying one's memory back to the Cherry blossoms of Japan is *Cassia Nodosa,* native of East Bengal and the evergreen forests of Burma down to Tenasserim and Chittagong. The flowers are large and very delicate, a pale pink or white, appearing in short, softly pubescent, densely-bracted racemes in the axils of the leaves, or above the scars of the fallen ones. The three longer filaments are thickened and roundish at the middle.

The pinnate leaves are about 1 foot long with from 6 to 12 pairs of leaflets.

*Cassia Renigera* is very similar, but the flowers are of a richer pink and more showy, and the calyx is densely pubescent. It is fairly common near Prome and Ava.

*Cassia Marginata* is indigenous to South India and Ceylon. It has spreading and drooping boughs which appear over-weighted with their wealth of clustering fragrant bloom, ranging in tone from white, through pink, to a deep rose and marked with greenish veins. It is a slow growing tree, blooming from the third year, and if left untouched by the pruning knife is naturally of a most graceful habit. It has been so called from the coloured and thickened margins of the leaves. The fruit is cylindrical, about 10 inches long, rather slender and of a dark brown colour.

All the pink *Cassias* have a long season of blooming and consequently are a valuable addition as ornamental trees.

### (III) CASSIA SIAMEA: Ponnavārai (*Tamil*) and Maizalee (*Burma*).

*Cassia Siamea* is the least attractive of the family, having nothing of grace in its foliage nor of beauty in its stiff spires of scattered flowers.



CASSIA SIAMEA.

The leaves are compound, and the leaflets oblong.

The flowers are bright yellow, consisting of five petaloid sepals, unequal, concave and imbricate. There are also five yellow petals with long claws, and ten robust stamens, altogether a most dishevelled inflorescence. Even the branch traceries are awkward, for all the boughs ascend at very sharp angles, thus affording recesses for the formation of little pools of rain water, which are believed to aid in the decay of the tree and to render it unsafe for avenue planting. The fruit is a thin flat legume, opening by both sutures.

The *Cassias* are very important in their medicinal value, providing the well-known Senna. The root bark is used as an application in gout and rheumatism, the seeds are a remedy in ophthalmia and the flowers are employed as a pleasant febrifuge.

(IV) PTEROCARPUS, P. MARSUPIUM and P. SANTALINUS. THE RED SAUNDERS WOOD. Bija sāl (*Hind.*). P. INDICUS. THE BURMESE ROSEWOOD. Pa-touk (*Burma*).

This bright-flowered genus is found in South and Central India and in Burma. The Indian variety *P. Marsupium* nearly became extirpated except in inaccessible forest tracts, but is again being vigorously cultivated. It is a tree of remarkable economic utility, attaining a magnificent size and yielding beams 20 feet long and 1½ feet square. The very durable close-grained wood takes an exquisite polish and consequently is admirably suited for furniture. The rough outer bark exfoliates in heavy scales, and from the rusty inner bark flows a copious gum resin, which is obtained



PTEROCARPUS INDICUS.

*The Burmese Rosewood.*

by making V-shaped incisions and collecting the sap in shallow pans where it is allowed to dry into the astringent, very brittle, ruby-red mass which is the true *Kino* of commerce, employed medicinally and in dyeing and tanning processes.

The leaves appear in great profusion, dark-green and shining and growing gracefully in long alternate plumes comprised of irregularly opposite leaflets, covering the tree almost from summit to base.

The fugitive bloom, appearing when the year is young, also loads the branches with great spreading panicles of fairly large and clawed yellow flowers, very highly scented and in the forest having the remarkable quality of all blooms opening on the same day on every tree in the neighbourhood; all day the air is a sensory intoxication while in their vicinity; at dusk the flowers fall, forming, by morning, a thick yellow carpet under the trees.

The pod is flat and compressed marginally, with the seeds in the centre, 2 or 3 only at most and each in a separate compartment. Ordinarily trees and plants are most extravagant in the matter of seed production, but in the *Pterocarpus* as the fruit ripens, one only of the cells develops and one only of the ovules is converted into a winged seed, whose form has suggested the generic name, *pteron* meaning a wing and *karpos* a seed. This heritage of winged appendages is not a matter of mere accidence, but a condition essential to the further establishment of certain tall trees, among which seeds of this nature occur. The force of wind increases with altitude, so height is obviously an advantage if seeds are to be conveyed

unimpeded to some distance, and the lighter they are, the further afield can they be carried.

*P. Santalinus* is the Red Saunders Wood of the Madras forests, and yields a deep red dye known commercially as Red Saunders, and exported largely. *P. Dalbergioides* of the Andamans is an immense tree, attaining fifteen feet in circumference. The flowers are in lovely green and violet panicles.

(V) BAUHINIA. THE MOUNTAIN EBONY. White (*Kachnāv*), Deep-rose (*Khārwal*), Variegated (*Kachnār*) and *Vana Raja* (*Bo.*).

The *Bauhinias,* owing their name to two brother botanists called Bauhin, are moderate sized trees, which occur practically all over India and Burma. The leaves are characteristic, being strongly nerved, disunited beyond the middle, and bearing some resemblance to a butterfly; they are acid and eaten as vegetables. During the cold season they fall off, and in the early spring the bare trees are clothed with the most exquisite purple, rose, variegated or pure white blooms.

In *B. Acuminata* the flowers are white, sometimes at the base a pale yellow; in *B. Purpurea,* very large and showy from rosy purple to bluish white, the anterior petal having a yellow smudge where it joins the tawny velvety calyx; some are a deep rose; in *B. Variegata,* pale purple toning down to white or flesh pink, with the larger petal yellow or even orange and blotched with violet. All the varieties have their inflorescence as short velvety racemes, appearing at the ends of the branches and just above the scars of fallen



BAUHINIA.

*The Mountain Ebony.*

leaves, and all have one petal larger and flushed with deeper colour. There is yet another variety, native of Ceylon, *B. Tomentosa,* carrying pale yellow petals, blotched and spotted with red, which superstition ascribes to the sprinkling of the blood of the martyred St. Thomas. A creeping *Bauhinia* of Sylhet is an extensive climber, the stems assuming so remarkable a resemblance to mighty serpents, that pieces of them are carried about by itinerary Fakirs in the belief that they afford protection from snakes. Unfortunately, the cloven leaves of the *Bauhinias* are frequently infested with a small destructive insect, which utterly ruins the foliage.

The wood is moderately hard and is used for the construction of agricultural implements and house posts. The bark is employed in tanning; the leaves serve as fodder for animals, and pickled with the flower buds, are eaten. But the tree is chiefly cultivated for the ornamental flowers, which are offered in the temples.

*Bauhinias* are pollinated by many birds and the seeds are disseminated by white ants and other insects, for the pods fall and rot on the ground and the seeds are then carried abroad. Seedlings germinate wonderfully well on new soil formed by landslips in the outer Himalayas since the earth is fairly loose at the time.

## MELIACEÆ.

### (I) MELIA AZADIRACHTA. The Margosa Tree. Nim (*Vern.*) and Thinbow-ta-maka (*Burma*).

The *Nim* belongs to an order in which bitter, astringent and tonic qualities prevail in root, bark and leaf, and ranks high among our medicinal trees. It is tall, handsome and evergreen; the leaves are curved like the blade of a sickle, bright and shining and deeply serrate, and according to Indian belief it was from observing them that the earliest carpenters were prompted to the invention of the saw. They diffuse a most disagreeable odour when crushed.

Though the properties of the tree are so well known all through India, it is surprising how few are acquainted with the strong honey-scent emitted by its multitude of white star-like little flowers, but one would imagine that the constant crowds of hovering bees would advertise the fact. It is a most dainty, white, lace-like inflorescence which springs in loose clusters from the axils of the leaves, converted later into bunches of yellow drupes beloved by all birds, and whose seeds furnish Margosa oil which is nearly as efficacious as the renowned Cod-liver in the cure of tuberculous glands and leprosy; the leaves are anthelmintic and are lopped for goat and camel fodder; the bark is a febrifuge, and from it is also extracted a kind of toddy famed as a tonic; even the gum has stimulant properties and forms one of the ingredients of the famous *Gum Gattie* of commerce.



MELIA AZADIRACHTA.
*The Nim Tree.*

The *Nim* is one of the sacred Hindu trees, and the wood is made into idols. It also enters into the mystic combination of five branches—*panchperwa*—which are placed in water-pots by women at certain festivals to assure health in the home. When smallpox is prevalent, a bunch of the leaves is tied to the house door; though this also indicates a birth or death and is supposed to ward off evil spirits since all parts are employed in the practice of magic and are connected with serpent worship; fresh leaves are given to the victims of snake-bite to chew; if they taste sweet, he will die, if bitter, he will recover; beds of those stricken with smallpox are entwined with wreaths of *Nim* and Jasmine to propitiate the goddess Sitala, the only deity who can restore the patient to health.

The tree takes name from Melia, the Greek word for the Ash in allusion to the resemblance of the leaves.

(II) MELIA AZEDARACH. THE PERSIAN LILAC, THE BEAD TREE or THE PRIDE OF INDIA. Bakain (*Vern.*), Malla nim (*C. P.*) and Tha ma-kha (*Burma*).

This is a very beautiful, fast-growing tree found all over India and Burma and replacing the *Nim* in the Punjab, Baluchistan and Western Asia. By reason of foliage, bloom and fruit it is ornamental all the year round. The leaves, sharply pointed and more or less serrate, fall off in the cold weather, but at that time the tree is laden with bunches of ripening berries, yellow and luscious at first when they are greedily devoured by bulbuls, later becoming very wrinkled. The flowers appear on the leafless branches in March; they are a



MELIA AZEDARACH.

*The Bead Tree.*

soft lavender, with an erect deep purple staminal column, and have a delightfully languorous perfume, which particularly at nightfall permeates the atmosphere for a considerable distance.

The tree has been most successfully introduced on the French Riviera where it is known as *'L'arbre de chapelets'* in reference to the nuts which are converted into rosaries, for which purpose they are peculiarly well suited, having a natural perforation through the centre.

The fresh fruit and leaves have a certain narcotic property which leads to their being pounded and used as poultices in headaches. The wood is reddish and takes a good polish, and is employed for furniture though it readily warps and splits. The bark is extremely bitter and enters into the indigenous pharmacopœia as an anthelmintic; the fruit yields an oil.

The tree grows readily from seeds and cuttings and perhaps because of the bitter bark, the saplings are never touched by rats, but being shallow-rooted are easily blown over by storms.

## MYRTACEÆ.

(I) CAREYA ARBOREA. Kumbi (*Hindi*) and Ban-'bway (*Burma*).

Scattered all through the forests of our Eastern and Western Coasts, Sind, Bengal and Burma is the *Careya Arborea*, a large strong looking tree with big broadly ovate leaves which fall off in the hot weather.

In the cold weather the leaves show a flaming red, a last burst of beauty before a period of bareness. Early in the year the new foliage appears, and shortly before, the tree flaunts very showy large pink and white flowers. The petals, greenish white and homely looking, are adorned with long coloured filaments fixed in circles on a fleshy deciduous ring, which drop off *en masse* at earliest dawn, converting the ground below into a lovely carpet. These tassel-like flowers are arranged in dense cones terminating in round green buds at the top, and have a most unpleasant smell, proving wonderfully alluring to flies, which as long as the bloom lasts frequent the vicinity in crowds. The fruit is a great green globe, nearly three inches in diameter, with a thick rind and numerous seeds in a fleshy pulp, crowned with the calyx segments and the long thread-like style, known as *Khuni;* it is eaten in the Punjab and also given to cattle.

The tree has many economic uses; the bark is now employed as rough cordage, and formerly, in making a slow match for native firelocks for which purpose it was enclosed in a scrap of many coloured cotton. It is



CAREYA ARBOREA.

said that wild pigs are very partial to the bark and it is used by hunters to attract them. The strong wood is used for Sontali cart wheels, and furnishes the frames of the drums of Sepoy Corps. It is, however, liable to split when overheated by the sun's rays. In Assam it is much sought after by boatmen for the construction of oars and rudders, because of its elasticity and durability under water. The calyces are a valuable expectorant in Sind, and as *Vákumbhá* are sold in the markets.

The caterpillar of the Tasar Moth feeds on the leaves; the flowers are pollinated by mynas, sunbirds and flower peckers.

(II) BARRINGTONIA ACUTANGULA. Injar (*Vern.*) and Kyaynie (*Burma*).

Congener of *Carcya Arborca* this tree, however, is evergreen with obovate leaves crowded at the ends of the branches, and narrowed into short petioles.

The flowers are arranged in long pendulous racemes, and when in full bloom lend a rare beauty to the tree, decorating it with red and white cords which droop for several feet. Very early, the rings of filaments fall away and cover the ground below; they have not a repulsive odour.

The tree is common on banks of streams, in swamps and in damp places generally; it thrives in Bengal, Burma and South India, especially near Travancore.

The wood is reddish but turns black, and being strong and tough is used for furniture and in boat building.



BARRINGTONIA ACUTANGULA.

The pounded bark is employed in poisoning fish and is good for tanning.

The fruit is oblong in shape, about 1½ inches long, sharply four-cornered, crowned by the calyx-limb, and containing one seed.

## LYTHRACEÆ.

LAGERSTRŒMIA FLOS-REGINÆ. CREPE-FLOWER. Tamán (*Bombay*), Jarul (*E. Bengal*), and Pyimma (*Burma*).

This is a large, bulky tree of the moist forests of E. Bengal and Burma and at the foot of the Ghats on the Western Coast. Everywhere it is valued as a timber tree, only next to Teak in utility, and is much employed in shipbuilding and in all constructions, including gun carriages. The leaves are ovate, entire, alternate and shortly stalked.

The tree takes name from Magnus Lagerströne, a friend of Linnæus.

The roots are astringent and used by the Assamese in thrush and sore throats.

During the hottest months of the year the showy mauve inflorescence delights the eye. The flowers are very beautiful, nearly three inches across with six delicate rose coloured petals long-clawed and very crumpled growing deeper through the day until they become purple in the evening, the calyx pale green and deeply furrowed and the buds urn-shaped; they are borne in huge erect panicles from the ends of the branches.

*L. Indica,* cultivated in gardens throughout India, is a smaller tree, yet attaining 50 feet in the Assam forests; the flowers are so crinkled that they have gained the popular name of Crepe-flower. There are white, pink and lilac varieties.

PLATE IV



LAGERSTRŒMIA FLOS-REGINÆ.

*The Crepe-flower.*

*L. Parviflora* is a large deciduous tree, the *Dhauri* of Oudh, where it is plentiful. It bears white fragrant blossoms in lax panicles. The petals are very waved.

*L. Thorellii* is a new variety with white and mauve flowers on the same tree. Being very popular for its beauty and long season of bloom it is *le dernier cri* in tree-planting.

## APOCYANACEÆ.

(I) PLUMERIA ACUTIFOLIA. PAGODA TREE, FRANGIPANI OR THE LIFE TREE. Gala Chin (*Kalki Hindi*), Khairchampa (*Bombay*) and Ta-yop-sa gah (*Burma*).

The *Plumeria*, named after Charles Plumier, a French traveller and botanist, has been introduced into India from Peru, and has become so popular that it is cultivated in every province and now extends as far as Siam and Cochin China.

It is a small gouty-looking tree, which is often leafless but rarely out of blossom, with thick, smooth branches that do not taper at all, and are full of a tenacious white milk. When the leaves appear, they are large and ovate, with distinct parallel nerves which run laterally and unite marginally. It is much planted about temples and especially in Mohammedan burial grounds.

The short branches end abruptly in tufts of white and yellow, funnel-shaped, excessively fragrant flowers, which retain their scent even when they fall. Later the stiff leaves appear around them. It is called the Life Tree in Ceylon where it is a favourite in Buddhist worship, being regarded as an emblem of immortality, because of its wonderful power of leafing and even blooming when out of the soil, if kept in the shade.

The follicles are dark and rigid, about six inches long, but for some reason seldom produce seeds. *Malis* allege that they are eaten from the tree by cobras, and in many places the seeds are boiled in milk and prescribed as an antidote in snake-bite.



PLUMERIA ACUTIFOLIA.

*The Life Tree.*

Another variety, *P. Rubra,* has been introduced from Jamaica and is established throughout the warm parts of India and Burma; it has rosy pink flowers crowded in fascicles and most fragrant.

For all its fragrance, the *Frangipani* is not exactly what one would consider an artistic tree, and time was when I vigorously excluded it from my garden, but one day I came upon Waterfield's eulogy of it in his "Ballads", and now, for the very beauty of his ideas and the music of the poem, it is one of my favourites. These are the lines :—

"Well have our fathers done,
Tree of the silent one
Still in thy praise shall the story be said,
Well did they, choosing thee
First of the wood to be
Watcher and guard of the graves of the dead.

Others are fairer trees,
Waving along the breeze
Bending with mourners the wan weeping head.
Rough and uncouth thy form,
Steadfast before the storm
Pointing to Heaven from the graves of the dead.

Others have brighter hue,
Heaven's own starless blue.
Purity's white, and Affection's deep red.
Thou with thy blossoms pale
Scented the evening gale
Hallowing with incense the graves of the dead."

"Others have shadowed screen,
Where sweet birds unseen,
Sing their wild notes on the waving boughs reared.
Thou from thy leafless bough
Puttest forth flowers enow,
Smiling through grief o'er the graves of the dead.

Others their treasures cast
After the bloom is past,
Withered and scentless the gifts that they shed.
Thou while thou flourishest
Giveth thy first and best
Strewing thy buds o'er the graves of the dead.

Therefore thy name we praise
As in former days
When on the tombs, thy first of'rings were spread.
Forest flowers day by day
Thou shalt unwearied lay
Sentinels sure at the graves of the dead".

(II) ALSTONIA. The Devil Tree. Chatiūn or Satián (*Vern.*), and Let-tope (*Burma*).

The *Alstonias* are tall evergreen trees, often fluted and buttressed, belonging to the periwinkle family.

*A. Scholaris* bears greenish white flowers, in compact groups on whorled stalks radiating from a common centre, and issuing from the axils of the leaves. In Bombay it is popularly known as the Devil Tree, for the people have a superstitious fear of it, believing that every leaf is the abode of a particular spirit and that once a year all the trees of the forest assemble to do homage to it. *A. Macrophylla* has a more lax formation.



ALSTONIA MACROPHYLLA.

*Alstonias* are found in Bengal, Burma, Ceylon and the Indian Archipelago. The bark, dark grey and rough, is extremely bitter, and is considered a powerful tonic; but this utility is the tree's undoing for sooner or later it is mutilated and then dies away. The wood is white, exceedingly light and seasons badly. It is used for packing cases, tea-boxes, for beams in Assam, for coffins in Ceylon, and for all school black-boards thus gaining for *A. Scholaris* its specific name.

The leaves are tough, thick and shining, with numerous parallel, lateral nerves. Though they shine so bravely, on touching them they will be found to be covered with a coat of silky down, which, of course, is a provision to reduce the rate of evaporation of the water in the tree, and is therefore of great importance to its well-being. This shining character is shared by most evergreen trees; it reflects the heat rays and prevents their absorption, thus keeping the temperature of the leaf down and removing a further source of evaporation.

The fruit is two, slender, paired follicles over a foot long, which hang in clusters and are much employed by mynas in the construction of their untidy nests.

*A. Macrophylla* is similar, but has smaller flowers in looser panicles, and the leaves are more pointed.

## (III) HOLARRHENA ANTIDYSENTERICA. THE EASTER TREE. Kurchi (*Bombay*), Kūra (*Hindi*) and Let-top-gyee (*Burma*).

*Holarrhena Antidysenterica* is a moderate sized, deciduous tree concerning which for a great many years much confusion existed, for through an early mistake



HOLARRHENA ANTIDYSENTERICA.

*The Easter Tree.*

it received the name of *Wrightia Antidysenterica*, and being mixed with *Wrightia Tinctoria* fell into disrepute owing to the inert action of the adulterant.

It has a short, straight, furrowed and firm trunk, which readily exfoliates in thick irregular scales known as *Kurchee*, and considered a sure remedy in dysentery.

The foliage is particularly bright and green, the leaves being elliptic-oblong, acute at the tips and with a wedge-shaped base where they join the stalks.

The tree is in full bloom at Easter, so the flowers lend themselves to the decoration of churches for the festival, hence the popular name. They have a very deeply cleft calyx, and a white or faintly cream corolla with oblong lobes spreading from a slender tube and overlapping to the left. They are slightly fragrant.

The fruit, of two distinct follicles, is smooth and contains narrow, oblong seeds $\frac{1}{2}$ inch long, brown and bitter and covered with silky hairs twice as long and of a greyish colour. They are known as *Indra jau* and enter into the Persian pharmacopœia as relievers of asthma and colic; as far back as 1563 they were used in the treatment of dysentery by the Portuguese who called them *Herba Malabarica*.

The tree is very gregarious and sends out numerous root suckers, and consequently is considered a reclaimer of waste lands. It is often associated with *Sal* in the forests of Bengal, Oudh, Assam, Central and Southern India and near Chittagong. The wood is white, tinged with pink, soft and even-grained, and is largely used in the vicinity of Saharanpur for carved articles, such as

toys, spoons, combs and bread platters. In Assam, where the tree grows to a larger size, furniture is constructed from it. Beads made from this wood are worn as charms all over India.

The flowers are in great demand as decorations at Indian marriages; and the leaves serve as fodder for cattle.

## BORAGINEÆ.

### CORDIA SEBESTANA.

India is the home of quite a few *Cordias;* in the Dūn forests, Sind, the Satpuras and in Burma; however, the most showy of the tribe is this foreign variety imported from Cuba, whose brilliant trusses all the summer through bid for our admiration, for turn where we will, we are bound to come across a tree or two. Unfortunately in our gardens it is generally dwarfed and confined to shrubberies, but in the open forest it reaches 40 or 50 feet, and bears broad leaves coarsely wrinkled and so rough as to be disagreeable to the touch, and flowers, which are an absolute scarlet, issuing from furrowed green calyces, one inch long. Unlike most tree blooms, the flowers last a long time when placed in vases. The fruit is a pure white drupe, the seeds of which very soon lose their power of germination. Called after Cardus a botanist of the 16th century.

Most of our indigenous *Cordias* bear white flowers in March. *C. Myxa,* so common in the Dūn, where it is known as the *Lassora,* has very velvety round leaves when young, white flowers in loose scorpioid cymes, and a fruit when ripe, glossy and yellow, full of a viscid, sweet transparent pulp which is eaten and used as a bird-lime and forms the drug Sebestena when dried and pounded.

> " Sovereign plants to purge the veins
> Of melancholy, and cheer the heart
> Of those black fumes which make it smart ".



CORDIA SEBESTANA.

The wood is soft and porous, but seasons remarkably well and is employed in boat-building and for agricultural implements and is excellent fuel. The bark is made into ropes, and the leaves are used as plates and in Burma for cigar envelopes.

*C. Vestita,* the *Barola* in the North-West and the *Kūm* elsewhere, is smaller with a wonderfully rounded crown; it has leaves very true to the family, and dense, compound cymes of yellowish white flowers. The drupe is full of a gelatinous pulp and is eaten, while the wood, which is more elastic than the others, is converted into wheels.

Then there is *C. Fragrantissima* of Burma, on the hills near Martaban, which gains its name from its deliciously fragrant wood. The flowers are white also, sessile in very forked and scorpioid cymes which are covered with short velvety hairs.

In the Andamans *C. Subcordata* occurs, with large showy brick-red flowers arranged similarly at the end of the branchlets.

The *Cordias* all have short, crooked stems; short out of all proportion to the tree height, and one on Mt. Tilla in the Punjab Salt Range was described as being only 30 feet high, but owning an 8 feet girth.

## BIGNONIACEÆ.

### (I) BIGNONIA CRISPA. Pādiri (*Tamil*).

The Bignoniaceæ is a widespread order almost all of whose members bear large, showy, trumpet-shaped flowers; the calyx is always in the form of a bell; of the five stamens two are long and two short, paired and fertile, and one sterile; the seeds with winged appendages lie in a long flattened pod.

*Bignonia Crispa* is a remarkably handsome tree, not only because of its great drooping boughs of shining and distinctly veined foliage, but also for the surpassing beauty of its pearly-white, crisp-edged, funnel-shaped flowers, delicately fragrant, which as buds stand erect and glimmer like silver candlesticks on a Xmas tree. They are largely used in Hindu temples to adorn the idols of Vishnu, and it would be difficult in the vegetable world to find a lovelier sight than these pure night bells,

> "Which waxen forth to meet the moonlight sheen".

It is a tree of South India, but does very well in Bengal, flowering in May and June and the fruit ripening later in the year. The timber is strong and heavy, rather light-coloured and is esteemed in the Madras Presidency for building purposes.

Plate V



BIGNONIA CRISPA.

## (II) SPATHODEA CAMPANULATA. The Flame Tree or The Fountain Tree.

A handsome and conspicuous kinsman is *Spathodea Campanulata,* introduced from the forests of Uganda and the northern part of the Congo basin. It is easily distinguished in March, when it carries gorgeous terminal cymes of large, brilliantly crimson flowers which are shaped like the old pictured Roman lamps, so that when the tree is in full bloom it appears to flash and gleam and burn as if it was decorated with many flaming lights. Flowers in April and again later.

The soft velvety olive-coloured buds appear almost hollow, and contain a quantity of clear liquid which mischievous boys love to use as water-squirts, hence the popular name "Fountain Tree".

The leaves are pale green and smooth and generally approximate to the ends of the branches; they fall off for a few weeks and reappear with the bloom. The tree does well in Bengal and South India. Other common varieties of the *Spathodea* are *S. Roxburghii,* the *Warras* of Bombay with fragrant light rose-coloured flowers, supported by a calyx and stalks covered with a tawny velvet, and arranged in large terminal erect panicles; it also flowers in March and appears frequently in the Canara and Godavari forests. And *Bignonia Amœna,* of the Malayan Peninsula and Burma but cultivated in India, with flowers quite large and fragrant, white, with a tube pale rose-coloured outside and orange-brown inside. The rusty capsules are thin and cylindrical, nearly two feet long.



SPATHODEA CAMPANULATA.

*The Fountain Tree.*

*Spathodea Campanulata* and others of the same family are fertilised by the activities of crows, mynas, bulbuls and sunbirds.

## (III) DOLICHANDRONE STIPULATA.

The *Dolichandrones* are also members of this much arranged and rearranged order, which appears so unable to make up its mind as regards the trees which belong to it. And to the untrained observer, it would seem little wonder that there is so much difficulty.

Each tree is remarkable for the beauty of its flowers and many afford valuable timber and yield dyes.

*Dolichandrone Stipulata* is fairly common all over India; a tall tree with a beautiful fleeting inflorescence of large, irregular primrose bells, each issuing from a beaked and rusty brown sheath, opening at night and falling at dawn. The odour of the flowers is somewhat disagreeable, but nevertheless they are eaten by the poor in times of scarcity. The leaves of the drooping boughs are either a deep olive or a lovely bronze in colour; and the pods, covered with a thick brown felt, sometimes attain 24 inches in length.

## (IV) KIGELIA PINNATA. THE SAUSAGE TREE.

*Kigelia Pinnata* is also an alien, first distributed over the Bombay Presidency from the seeds of a single fruit picked up by a sailor and now established very securely all over India. It is a native of Abyssinia and Nubia and as far south as Natal. Formerly it was referred to the Nat. Order *Crescentiæ,* but has now been included in this family.



DOLICHANDRONE STIPULATA.

It is a wide spreading, coarse looking tree which attains great size; the drooping branches are bare to a great length, but at the ends break into masses of opposite leaves.

The inflorescence is a huge candelabrum of very wrinkled ochreous and striped bells, with a deep maroon lining against which the characteristic lyre-shape of the filaments, each terminating in a large anther, is very distinct. These bell-stalks often hang for seven feet before putting forth a single bloom, and each flower is so twisted that it turns upwards. They are very evil-smelling and attract hordes of bottle and other flies. Cunningham says:—"In cases of this nature it seems probable that the source of attraction lies, not in any deceptive advertisement of suitable accommodation for eggs, but in an honest invitation to partake of stores of desirable food, such as those which butterflies often find in the flowers of trees and shrubs on which their larvæ certainly do feed. Whatever the nature of the attraction may be there can be no doubt that it must efficiently make for the occurrence of cross-fertilisation of the flowers".

It is a tree of wonderful consistency, for the fleshy smelling flowers are succeeded by immense gourds, one and two feet long resembling Bologna sausages, and filled with pulp containing many round seeds.

In Natal it is considered one of the most sacred trees of the people; and before the refining influence of civilisation interfered, many weird and dreadful religious ceremonies were performed under its distorted boughs, while even now, poles of its wood are erected



KIGELIA PINNATA.

*The Sausage Tree.*

as objects of special veneration before the chiefs' houses. The gourds cut in half and roasted are employed as poultices in rheumatism, etc.

*Kigelias* thrive particularly in cool situations, and by the margins of tanks.

(V) MILLINGTONIA HORTENSIS. The Tree Jasmine or The Cork Tree. Koula Nim (*Bombay*), Akás Nim (*Hindi*) and Ay-ka-yit (*Burma*).

*Millingtonia Hortensis*, the *Tree Jasmine* or *Cork Tree*, believed to be indigenous in Burma but only cultivated in India, and easily transplanted even when of very large size, is of the same order and largely employed as a roadside tree. It is very tall, with deep-green finely divided foliage, and bears during the rains a profusion of long-tubed fragrant white flowers, which, falling early, convert the paths below into a veritable "Milky Way" composed of myriads of little fallen stars.

The young leaves and inflorescence are slightly pubescent, and the whole arrangement of the tree is so beautiful and so gladsome to look upon, with its aspiring branches, continual fluttering of the foliage and silver sheen of the blossoms, that it may well be described as "The Venus of our Indian Forest". It is almost exclusively pollinated by sunbirds.

The bark, deeply cracked and corky, peels off easily; the wood is light-coloured, closely grained and takes a fine polish. Suckers are freely produced and apt to be troublesome.



MILLINGTONIA HORTENSIS.

*The Cork Tree.*

The fruit is a capsule about $1\frac{1}{2}$ feet long and compressed, containing seeds nearly an inch across, thin and flat with a fine transparent wing surrounding them on three sides. The tree very rarely seeds in North India.

## (VI) JACARANDA MIMOSIFOLIA.

Another alien, brought to India from Brazil and doing splendidly in dry situations such as the North-West Provinces, where it soon recovers from the slight nocturnal frosts of the winter, is *Jacaranda Mimosifolia*, undeniably the most elegant of the *Bignoniaceæ.*

Early in the year, it drapes itself all over the old wood, with a profusion of deep purple buds which reveal themselves later in showy terminal panicles as softly beautiful, pale-bluish flowers. The corolla tube is constricted at the base, but suddenly dilates and divides into five unequal lobes; there are the four characteristic fertile stamens and a rudimentary fifth.

The leaves, as the name would imply, resemble the fine-leaved acacias, and are broken up into numerous pinnæ their form alone indicating the soil in which these trees can best thrive, thirsty places with plenty of sand. If grown in Bengal, or other similar damp districts, good drainage must be assured.

The wood is beautiful and fragrant, bluish-red traversed by blackish streaks, and is known commercially as *Palissandre* or *Palixander* wood.

In the North-West the tree is easily propagated by cuttings in sand, kept well shaded till rooted.



JACARANDA MIMOSIFOLIA.

The bark is used medicinally, and the tree, if only for its ornamental beauty, might be planted more freely.

## GUTTIFERÆ.

(I) MESUA FERREA. THE IRON-WOOD TREE. Nāgsura (*E. Bengal*), Nāhor or Nagessur (*Assam*) and Gangaw (*Burma*).

One of the most attractive of our early blooming trees is *Mesua Ferrea*, the *Nagessur* of Assam, also growing in Burma. It has the advantage of being evergreen, and the lance-shaped blood-red young leaves, which slowly fade to pink and then turn a shining green above and shimmering silver below, are in themselves an adornment, apart from the exquisitely fragrant flowers.

Each blossom has four white petals set as a Maltese Cross, unfortunately often frayed from the close inward pressure of the strong calyces while in bud, and crowds of delicate, thread-like stamens forming a golden globe within. When dried the petals having a certain medicinal value are sold in the bazaar as *Nag Kesur*, and are also used for scenting sachets.

The tree grows in the shape of a cone; the bark is astringent, and the wood, close-grained, very hard and reddish-brown in colour, is known as iron-wood, a most useful and lasting timber, suitable for railway sleepers and heavy machinery, etc.

The fruit is a drupe, egg-shaped and nearly as large as a walnut; from the kernels is extracted the well known *Nahur oil*, considered invaluable in the treatment of skin diseases, and strung on to a bamboo



MESUA FERREA.
*The Iron-wood Tree.*

serve the Assamese as candles. The tree regenerates profusely from the seeds falling on the ground where they are eaten by pigs, porcupines, etc., and are thus carried afar to form new colonies.

(II) CALOPHYLLUM INOPHYLLUM. THE ALEXANDRIAN LAUREL OR SULTANA CHAMPA. Pongynyet (*Burma*) and Woondee (*Bombay*).

*Calophyllum Inophyllum*, the *Sultana Champa* or *Alexandrian Laurel*, is one of our littoral trees extending from Madagascar round India and the Andamans to Australia by means of its very hard seeds, which are transmitted by the sea from shore to shore. In India it is spread through the agency of fruit bats who visit them in great numbers during the night feeding on the fresh berries and frequently, on their return to their roosting places, carrying one in their mouths. Consequently, it is quite common in any beach forest, and is seen in the roadside avenues of most of our sea-side resorts.

It is evergreen, and as one would expect from the derivation has most elegant, shining, closely veined leaves; hence the name, *Kalos* beautiful and *phyllon* a leaf.

In the axils are borne the sweet-scented flowers in small loose racemes; the buds, having the appearance of being constructed out of white kid, open to display four snowy-white petals and a globe of golden stamens springing from a coral-red base. The berries are tawny, round and rather large; the fresh seeds, yielding an expensive scented green oil known as *Kekuna* or *Pinnay oil* used in medicine, have an economic value.



CALOPHYLLUM INOPHYLLUM.

*The Sultana Champa.*

The wood, close-grained, reddish-brown and heavy, is used for railway sleepers, ships' masts, spars, etc., and a green resin which exudes from the trunk is the *East Indian Tacamahac.*

## CORNACEÆ.

ALANGIUM LAMARCKII. Akota or Bismar (*Hindi*) and Alangi (*Tamil*).

Snatching "a grace beyond the reach of art" is *Alangium Lamarckii*, for whether in flower, fruit or foliage, it is strikingly beautiful.

It is a moderately sized tree, with all the softer parts unarmed and more or less velvety, except in quite dry climates when the branches become prickled. The leaves are thin and papery, somewhat pubescent below where they are much netted with reticulate veins. All the old leaves fall off before February and there is not a single one on the tree when the buds appear shortly after.

Slowly the tree wraps itself in a fluffy mantle of white; these are the filamentous fragrant flowers, most charming to the eye and still more worthy of appreciation if they are minutely examined; it will then be discovered that the silky petals are 5 to 10, about one inch long, with those facing the morning sun faintly tinged with pink. The calyx is 6-10 dented, and the stamens are many, up to 30, very hairy and supporting long anthers.

When the fruit appears, it is a crimson berry which carries the remaining calyx as an emerald green crown; as it ripens, it becomes black and is filled with an acid red pulp which is eaten. An oil is extracted from the seeds, useful for burning and employed in medicine.



ALANGIUM LAMARCKII.

The wood is tough and strong and is converted into posts, cattle yokes, and various other articles; being considered wonderfully sonorous, in Ganjam the leading bullock wears a bell constructed of it, called *lodoke,* whose sound is certainly carried far in the jungle.

The root bark is a poisonous emetic, and is used in native medicine as a substitute for ipecacuanha. It also has a great reputation as an antidote in cases of cobra bite, and old Sanskrit writers have gone so far as to say "that the juice of the plant has the power of driving the devil out of human nature !"

The name is from *Alangi,* the Malabar designation of the tree.

## VERBENACEÆ.

(I) GMELINA ARBOREA. Gamhār (*Hindi*), Sewān (*Bombay*) and Ya-ma-nay (*Burma*).

*Gmelina Arborea* is a charming tree of shady localities and the lower hills throughout India, Burma and Ceylon, but is nowhere plentiful and shuns alluvial soil.

Nature, always inimitable in her choice of harmonising colours, nowhere perhaps excels herself as when she blends yellows and browns; and a good example of this art is the exquisitely scented bloom of *Gmelina*. The flowers appear on a naked tree, from the end of February right on to mid April, and in shape bear some resemblance to those of *Antirrhinum*. They have five petals, four of which are tawny, and the fifth a bright yellow which in the bud is bent inwards and protected by the darker ones.

The leaves, broad and heart-shaped ending in a point, appear as soon as the season of blooming is over. They are so eagerly devoured by deer, that the trees cultivated near villages have to be protected. The Eri silkworm also feeds on them.

The fruit, an oblong drupe with a leathery rind, yellow when ripe and full of an aromatic sweet pulp, is eaten. The tree is chiefly pollinated by sunbirds, though mynas lend a hand.

The bark is grey and exfoliates in broad, scurfy flakes; mixed with the root it has a medicinal use. The



GMELINA ARBOREA.

light-coloured wood is very strong, neither warping nor splitting, and taking a good polish. It is excellent for making canoes and house posts, and is also employed for carving images and ornaments.

(II) TECTONA GRANDIS. THE TEAK. Sāigūn (*Hind.*), Tekku (*Tamil*) and Kyoon-pen (*Burma*).

The *Teak* is one of our most important trees, the wood having a large export trade and invaluable in the construction of houses, in shipbuilding, etc. Indigenous in S. and C. India and in Burma, the tree is widely cultivated in Assam and Bengal, thriving best where the mean annual temperature is between 70° and 80°. However, it is a growth of many surprises and can endure lower temperatures than indicated. For successful teak production three factors are essential; the absence of overcrowding, since it is a tree which must have both light and plenty of space in development, perfect drainage and a dry subsoil. Given these conditions, *Teak* has been found to thrive on sandstone, limestone, disintegrated basaltic rocks, and does particularly well on thoroughly drained alluvial soil. It is a tree which is always straining upwards to the light, and in crowded forest lands will put up a very rapid growth and attain a great height. The leaves are rough and of a large size, in the younger shoots larger still, sometimes 2 feet long; the lower surfaces are clothed with dense grey hairs. They are full of a deep-red sap which is thus accounted for in Central India: In the beginning of creation, Mahadeo took out his bull Nundi and a servant, a man of Orissa, to help clear the jungle for a field; he forgot something



TECTONA GRANDIS.
*The Teak.*

at home, so went back for it, and on his return he discovered that the man of Orissa had killed the sacred bull, and eaten the bleeding flesh on a teak leaf !

Unfortunately the leaves are devastated by the larvæ of sombre little moths, *Pyrausta Machæralis,* whose life history reads as romance. They have as many as seven generations in the year, each batch of eggs producing an enormous number of caterpillars, which feeding only on the parenchyma and not touching the veins, produce the skeletonised tattered banners so familiar on teak trees, and so utterly destructive to their appearance.

The flowers are wee, white and fragrant, clustered in huge panicles, striving always to overtop the foliage, and pushing through to reach the sunshine, so that they foam over the tree exactly as if it were "clad with a waving veil !"

The wood is hard and durable and has the valuable quality of neither warping nor shrinking once it is thoroughly seasoned. This is ascribed to the presence of the aromatic oil in the wood, which gives the pleasant smell and oily surface when teak is sawn.

## OCHNACEÆ.

OCHNA SQUARROSA. Yerra juvee (*Bombay*).

*Ochna Squarrosa* is a small tree rapidly rising in popularity for park planting. It is found in Bengal, Burma and South India, and also on the Bombay side within reach of the sea-breeze, but does not thrive in a dry, hot climate.

It has oblong-ovate, finely serrated and beautifully veined leaves, which are lost in the cold weather. On the previous year's wood, from February to April, the flowers appear crowding along the branches in brilliantly golden corymbs. The number of petals on individual flowers varies; in some there are 7, in others 12 and others again have only 5. The sepals are always 5. The filaments are numerous, topped with enormous anthers. The petals drop off early, and the fruit, also attractive, consists of 3 to 10 sessile drupes on an enlarged receptacle. Its only use is a medicinal one.

*O. Andamanica* and *O. Wallichii* appear in the Andamans and in Burma respectively; both have large brilliantly yellow flowers, and sharply serrulate leaves. The wood is too brittle for use.



OCHNA SQUARROSA.

## MAGNOLIACEÆ.

(I) MICHELIA CHAMPACA. Champa (*Hindi*), Sona Champa (*Bombay*) and Sagah (*Burma*).

This is a beautiful evergreen tree, very like the mango in habit and in the shape of its leaves. These are dark-green, entire and thick, shining above and in the bud enveloped in convolute appendages which are split and thrown off as the leaf expands.

It begins to bloom about April and continues intermittently throughout the year. The large deep yellow flowers are solitary, and rise in the axils of the leaves with short stout stalks from between small bracts; and so redolent are they of fragrant incense, that even bees are said to find it too heavy, and pass them by.

The fruit is a capsule on a long stalk, oval and dark coloured with large, round white spots. It soon opens and the oval, brown seeds hang out by long funicular cords.

The Champas are held in special reverence by the Hindus, being considered sacred to Vishnu; and in Coimbatore so great is the reputed sanctity of the tree, that nobody with shoes on is permitted to approach under its shadow; the wood converted into rosaries is sold to pilgrims at Hardwar, and is also used for furniture; and the root, having bitter properties, is employed as a tonic.

Some white-flowered varieties occur in South India where they are still more revered.



MICHELIA CHAMPACA.

*The Sona Champa.*

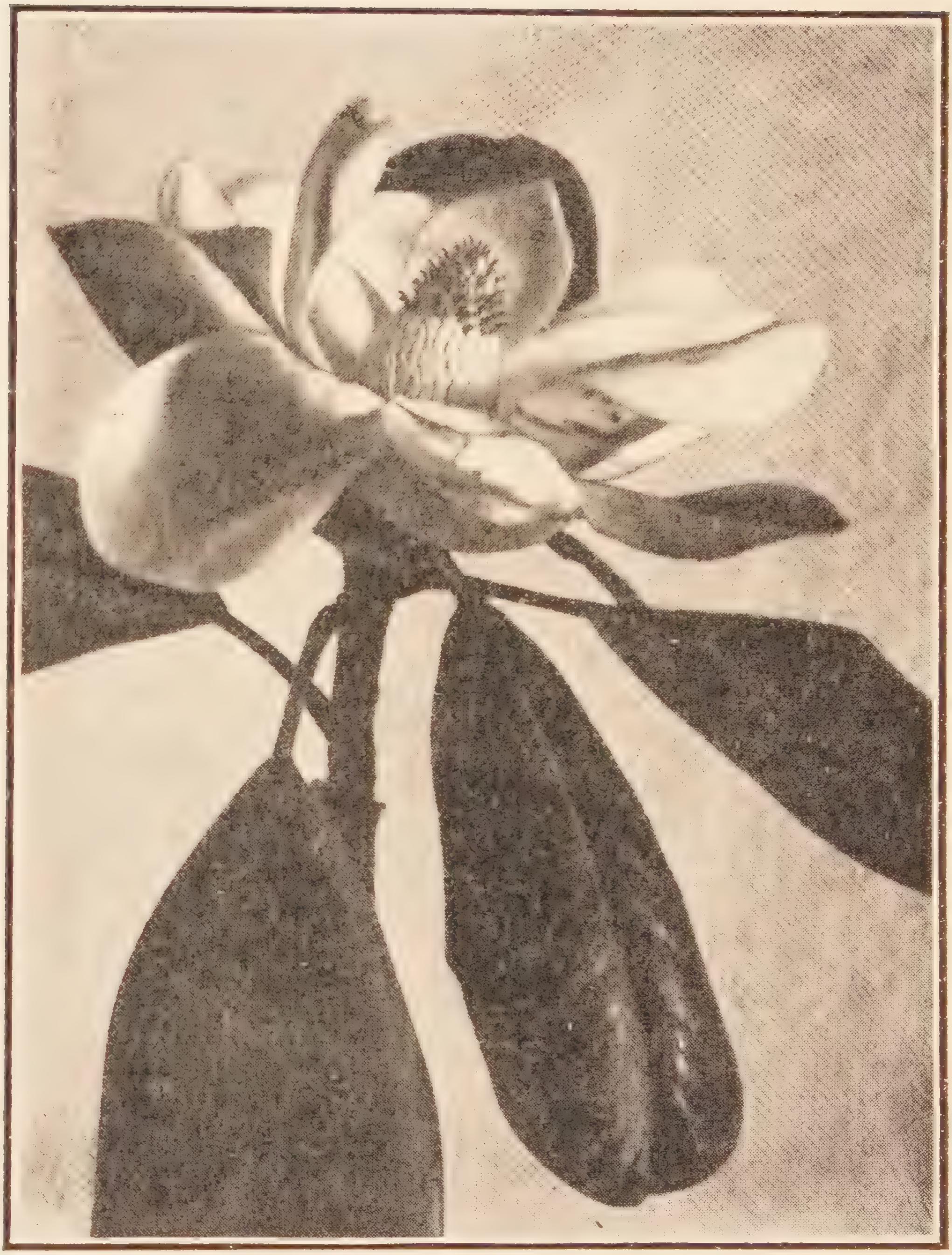
The *Muga* silkworm feeds on this tree. It is said that if placed on trees where others have already fed, they refuse to ascend. The silk resulting is a beautiful white, which was formerly reserved for the Ahon Kings of Assam, now it is the silk constituting the dress of the higher ranks in the province.

(II) MAGNOLIA GRANDIFLORA. Champa (*Hindi*).

All the *Magnolias* are handsome trees with very beautiful foliage and flowers. They are natives of India, Burma, China, Japan and N. America. *M. Grandiflora* is from the last named place, but has so established itself, particularly in Bengal and Assam, that we have forgotten its foreign origin. The leaves are large, dark green, extremely glossy on the upper surface and a soft velvety bronze beneath; in the bud they are closely covered with convolute stipules, which for awhile after expansion adhere to the stalks, and then fall off.

The flowers are massive and terminal, also protected in their infancy by sheathing stipules which sometimes develop into leaves, otherwise wither away. In May, the pure white, exquisitely fragrant cups open, disclosing nine to twelve petals in two or more series, arranged round a cone-like spike which contains the reproductive organs of the plant. Later, this becomes brown and beaked and all the imbedded follicles bursting dorsally, permit the suspension by long threads of the large dark seeds.

The tree is believed to have bitter aromatic and tonic properties; but fever has been attributed to the potent perfume of the choice bloom.



MAGNOLIA GRANDIFLORA.

*The Champa.*

*M. Campbelli* of the Himalayas is a superb species, reaching a height of 150 feet and displaying on a naked tree great crimson and rose-lined flowers.

*M. Sphenocarpa,* a native of Chittagong, has huge, white, oppressively fragrant flowers, and large oblong leaves.

## DILLENIACEÆ.

### DILLENIA INDICA. Chālta (*Bengal*) and Thā-pyoo (*Burma*).

This beautiful tree extends from the base of the Himalayas, through Bengal, into Burma and the Malayan Peninsula and southwards to Ceylon. In India it is a short, bulky tree with widely spreading branches, but in Burma it thrives wonderfully; in fact all of this species do much better in that land.

The leaves, large and ovate, generally approximate at the end of the branches; they are smooth above, but very rough beneath; and have numerous, closely drawn, parallel nerves which run laterally from a prominent mid-rib to the sharply serrate margin.

The flowers are solitary and terminal, quite seven inches across with a pale green hemispherical calyx, out of which issue five magnificent petals white as driven snow; in their centre is an erect style radiating in twenty directions, around which are thronged numberless golden stamens in lovely confusion, some pressing outwards and others inwards towards the stigma. The flowers are deliciously fragrant, and the tree, appearing in full bloom in June, when at its leafiest, seems one of the rarest and most beautiful efforts of Nature !

As the petals wither and fall away, the thick pale green sepals with membranous margins, spread until they enclose the large fleshy fruit as it forms. They



DILLENIA INDICA.

*The Chalta.*

have an acid taste and are eaten raw, cooked in curries, or made into cooling drinks.

The rough leaves when dry, are used for polishing horn and ivory; and a decoction of them when green is beneficial as a dressing in ulcers.

The hard brown wood is of service in house building and boat construction.

The germination of the seeds is interesting and remarkable, demonstrating another instance of the help the animal kingdom affords the vegetable one. The pulpy inside of the great fruits is devoured by white ants, who replace it with their galleried nests of earth, in which the seeds germinate successfully, the seedlings bursting through the dry shell; wild elephants delight in the fruit and help in the spread of the tree.

All the other *Dillenias* bear beautiful, large yellow flowers. The most golden of the family is *D. Aurea,* a native of Oudh and Burma; it sheds its old leaves in February, and soon after great solitary sunny flowers, 4 inches across, appear; the calyx also is yellow, so that the fruit at first looks very like an orange. It is the *Chamaggai* of Oudh, and the *Bū-ben* of Burma.

Other yellow *Dillenias* are *D. Pentagyna,* whose bloom arises in clusters, and also has an orange-coloured fruit; and *D. Pilosa,* with silky shoots, very long leaves, solitary yellow flowers 2½ inches across, and fruit similar to the others.

## CAPPARIDEÆ.

### CRATÆVA RELIGIOSA. Barnā (*Hindi*) and Ka-tāt (*Burma*).

*Cratæva Religiosa* belongs to the Caper family and extends through Rajputana, South India, Ceylon, Assam and Burma, not growing to any great height.

The leaves are trifoliate, oval, sharply pointed at the apex, connected with short jointed stalks to the main axis, and congregating towards the ends of the branches. Early in the year they fall off, and at the beginning of the hot weather reappear to usher in the unique and beautiful bloom.

The flowers are large and handsome, having four fugacious sepals, and four oval, broad, deep cream petals, enclosing 8 to 20 royally purple stamens enthroned on a fleshy receptacle. From their midst a conspicuous stalk is lifted up to nearly twice the length of the flower ending in a little globe, which is the one-celled ovary.

The fruit is an ovoid berry, the size of a tennis ball, very rough, speckled with white and full of a yellow pulp in which are embedded many kidney-shaped seeds.

The wood is smooth and close-grained, and being easily worked is used for drums and various fancy articles.

The leaves provide fodder for cattle; in the Punjab the fruit pulp is combined with mortar for a



CRATÆVA RELIGIOSA.

useful cement, in other places it is employed as a mordant in dyeing.

*Cratæva Religiosa* loves the neighbourhood of streams; it is held sacred on the Western Coast and also in the Society's Islands, and is planted in graveyards.

## SAPOTACEÆ.

BASSIA LATIFOLIA. Mohwa (*Hindi*).

This is a large tree abundant across India from Guzerat to Bengal, propagating itself by seedlings self-sown, and protected in most parts, for the *Mohwa* is to the people of Central India, Nagpur and Behar, what the bamboo is to the Assamese, and the coco-nut to the islanders of the Laccadives. It is their all, one of Nature's most valuable gifts to the poor. As a protection against famine systematic cultivation of the *Mohwa* on suitable land would prove a sound scheme.

Flowers and fruit are not borne before the tree is ten years old. Dry, sandy and even rocky soil is preferred to low-lying and inundated land.

The old leaves are shed gradually from January, and in April are replaced by the young ones, which appear as pale pink, papery whorls tipping each branchlet and are perhaps the chief ornament of the tree. The flowers precede them, very numerous, on drooping woolly stalks at the ends of the branches. The calyx is thick and densely covered with a fine rusty velvet; the fleshy and juicy, cream-coloured corollas constitute the principal value of the tree; but he who would acquaint himself with their nature of blooming, must visit the tree at earliest dawn, for at sunrise the flowers softly fall to the ground. Then the harvest commences, reminding one of the story of the manna in the wilderness: "And when the dew



BASSIA LATIFOLIA.
*The Mohwa.*

that lay was gone up, behold upon the face of the wilderness there lay a small round thing on the ground!"

The work of gathering in the snowy crop generally devolves on the women and children, who frequently come from a considerable distance and encamp in temporary huts made of *Sāl* branches in the vicinity of the trees. Before the flowers begin to fall, the people take the precaution of burning away all the leaves and grass at the foot of the trunks, so that no blossoms may be hidden and thus lost. And in front of each hut, the earth is beaten hard and smooth, for the purpose of spreading out the flowers to dry in the sun. Men visit the encampment only occasionally in order to carry away the loads of these dried reddish-brown petals. At night, deer, bears and other wild animals come to take their toll, jackals sweep round clamorous in demanding their meed, scores of jungle birds flock together noisily, and in the early mornings and late evenings numbers of pea-fowl approach,

> "And seem to say
> 'Ye meaner fowl, give place!
> I am all splendour, dignity and grace'".

The flowers that fall after midday until dusk are for the gleaning of the poor, who thus also share in this wonderful *fête-champêtre*.

A good tree yields from 6 to 9 maunds of flowers annually, and since two maunds suffice to feed a family of half a dozen, some profit is made by the gathering of each year. It has been calculated that the annual crop of *Mohwa* flowers, in all India, is worth about 35 lakhs of rupees.

Having been spread in the sun to dry, the flowers can be stored indefinitely and are eaten raw, or ground down and converted into cakes and sweetmeats. They are also a wonderful fodder for milch cattle, and are distilled into an ardent liquor, which the Bheels consume in great quantities in spite of its unpleasant odour. Some years back, large quantities of the flowers were exported to France to produce an imitation of French Brandy, but this the French Government very quickly stopped. They have also been sent to England for the feeding of pigs and have proved most successful.

About the middle of June the fruit is ripe, round berries, 1 to 4 seeded, green and fleshy; it is eaten, and, when expressed, gives a thick oil which is employed to adulterate ghee, in making soap and candles, for cooking, burning in lamps and a good basis for ointments. The oil-cake is kept for poisoning fish.

The wood is very hard and even-grained, seasons well and is durable and in the memoirs of the Emperor Baber it is referred to as "the most serviceable wood for constructing houses in Hindustan"; but the tree is so much valued for its flower and fruit that it is rarely cut down for timber. There is an old Mahratta tradition that it was the practice to cut down the trees in order to bring the jungle tribes into subjection.

## BURSERACEÆ.

GARUGA PINNATA. Khärpat (*Hindi*) and

Chin-yop-pen (*Burma*).

The family connections of the *Garuga Pinnata* all yield resin, which is used in medicine and, where particularly aromatic, burnt as incense; they inhabit arid, rocky hills scanty of arborescent vegetation, and are generally negligible as timber. The *Garuga Pinnata,* however, occurs associated with *Sāl,* in the hilly regions of the Himalayan foot-hills, in South India and Burma and does well in Bengal. It is deciduous, all the leaves falling off during the hot season.

Early in the year, large whorled panicles of tiny, yellow, velvety bells appear at the ends of the branches, very fragrant and apparently secreting much honey, since a tree in full bloom is a veritable paradise for bees, etc. Each wee flower has a five segmented, bell-shaped, green calyx; and, from every indentation, the yellow petals spring with ten stamens inserted below them.

As the flowers fade the new leaves appear, also approximating at the ends of the branches; they are nearly a foot long, made up of from 6 to 9 pairs of lanceolate, sharply pointed, dainty green, velvety leaflets; in a very short time many of them are tinged



GARUGA PINNATA.

with Autumn's fiery glow and appear brown, tawny and a rich crimson, so that the tree also displays

> "Scarlet tufts
> Glowing in the green".

This coloration of the leaflets is due to their attack by minute insects (*Psyllidæ*), known as springing plant lice, as their habit of jumping distinguishes them from their more leisurely relations; they are exuders of honeydew in large quantities, and galls form upon the new leaves wherever the young creatures collect together and suck the juices; this sets up an irritation which gives rise to the rough yellow and red patches, similar in appearance to the "Oak-Spangles" of the *British oak*, and, though really deformities of the tree, certainly have their value in the picturesque aspect of it.

The wood of *Garuga* is heavy, takes a poor polish and is not useful for much except fuel.

The fruit is very conspicuous when the leaves fall off; clusters of green fleshy drupes which bear some superficial resemblance to bunches of grapes; it is eaten raw and pickled. The bark is used in tanning, and the leaves and shoots, as the Indian name indicates, are lopped for fodder.

## RUBIACEÆ.

### (I) ANTHOCEPHALUS CADAMBA. Kaddam or Meo (*Vern.*) and Ma-doo (*Burma*).

The *Kaddams* are members of a valuable family, some of whom like *Cinchona* rejoice in medicinal virtues, others supply really valuable wood, a few produce exquisite flowers, and from yet another, *Coffea,* we obtain our popular beverage.

They are tall trees, characterised by a perfectly straight bole from which spread far many horizontal branches.

Wild only in Assam, South India and Ceylon, they are loved and cultivated everywhere. The leaves are very beautiful, ovate-oblong, sharply pointed, and with a particularly glossy surface reticulated with prominent lateral veins.

The golden-yellow flower heads, about an inch and a half across, are mostly solitary at the end of the branchlets; first they are green, then pale primrose with the white projecting corollas and large fusiform stigmas; finally,

> "Like the Hesperides of old,
> Trees of life, with fruits of gold".

August is their special season of enchantment; limbs, and sprays, and clustering, glossy, deeply-veined leaves all rise tier upon tier, loaded with radiant golden spheres exhaling a delicate perfume, and recalling to



ANTHOCEPHALUS CADAMBA.

*The Kaddam.*

readers of the *Prem Saga* their intimate association with the many adventures in *Krishna's* life, to whom they were particularly dear and in whose memory the flowers are offered at Hindu shrines, chiefly at the approach of the festival of *Manasha*, the protectress of men from snakes.

The legend of their origin in India tells how

> "King Garud, best beyond compare
> Of birds who wing the fields of air",

achieved the astonishing feat of perching on a tree with a tortoise 80 miles long, and an elephant double that length, in either claw. But the tree was unable to bear this ponderous weight, and as unhappily thousands of pigmy Brahmins were worshipping on one of its branches, he, trembling lest he should destroy any of them, flew off.

The fruit is fleshy, yellow and the size of a small orange; when ripe it is acid, and is eaten both raw and cooked. The seeds are chiefly spread by cattle and seedlings are thus seen in great numbers over grazing areas. Birds also eat the fruit and assist in the dissemination.

(II) GARDENIA LATIFOLIA. Paphār (*Vern.*).

*Gardenia Latifolia* is a moderate tree found in many parts of India where it is dry, Bengal, Behar, the Central Provinces, South India and Ceylon.

It is leafless in March; in early April the beautiful flowers appear, which are generally solitary and, being nearly sessile, look as if they were pinned on to the bare wood. They have a bell-shaped calyx, deeply and irregularly cleft into nine segments, and a



GARDENIA LATIFOLIA.

large fragrant, nine to eleven-lobed corolla white in the morning but yellow by nightfall. The corolla tube is quite three inches long, and the spreading limbs measure six inches across. The stigma is club-shaped, solid and fleshy. The fruit, like an apple in shape and size, is velvety when unripe, becomes grey speckled with yellow surmounted with the lower part of the calyx, and encloses a nut with a hard shell which ripens in the ensuing cold season or shortly after the new leaves appear in May.

The wood is yellowish but fine-grained and easy to convert into fancy articles. Dr. Roxburgh describes the beauty of *G. Latifolia* in unstinted terms.

## ANONACEÆ.

### POLYALTHIA LONGIFOLIA. The Mast Tree.
Debdari or Asōk (*Vern.*).

The *Polyalthias* are miracles of grace, especially when clad in their misty translucent new foliage, and are planted in an unbroken line. Seen thus, they must surely convince the greatest advocates of contrast, that any interference in their consecution would be contrary to the æsthetics of good taste.

They are indigenous in Ceylon, but favourite avenue trees in South India and Bengal, and being evergreen, the foliage is much in demand for decorative purposes. They are very tall, generally shooting up with a straight bole into lofty spires, or giving off many round branches which spread and form a close symmetrical head.

The alternate leaves are long and sharp, shining and all facing upwards, undulate and pellucid-dotted; these dots seen through a magnifying glass reveal themselves as small glands, and it is the oil which they secrete which gives the crushed leaves their peculiar and pleasant smell.

The flowers grow in great profusion about March on all the short branchlets, and being greenish-yellow give the tree the appearance of being swathed in moss. They have three sepals, and six petals, with numerous stamens packed tightly together on a convex receptacle in little spirals. The fruit, in clusters on stalks about half an inch long and not unlike coffee



POLYALTHIA LONGIFOLIA.
*The Mast Tree.*

berries, is most alluring to flying-foxes who visit the trees in great numbers at nights, quarrelling and squealing till morning; on returning to their roosting places at dawn, they may be seen carrying a fruit away in their mouths, and all the rejected stones of their nocturnal feast lie thickly strewn on the ground below. The wood is pale yellow and even-grained.

## EBENACEÆ.

### DIOSPYROS EMBRYOPTERIS. Persimmon or Kaki. Gāb (*Bengal*).

This is an evergreen tree introduced from China, but thriving well in Bengal and Burma and quite common along the backwaters of South India. It grows very erect, and the smooth shining leaves which closely cover its widespread branches form a fine crown. It flowers in March, and the sexes are on separate trees: the males in small drooping cymes of 3 to 6 flowers and the females larger, solitary and more shallow; both sexes are white and sweetly scented.

The fruit appears as a large apple; when unripe it is very velvety, but soon becomes less so, and as it is of a ruddy colour rather resembles a peach. It ripens in August, and though possessed of a disagreeable smell, is not unpleasant eating having the flavour between an apple and a melon. The Chinese convert it into a delicious preserve.

The light-coloured wood is used for buildings and the masts of small ships. The fruit pulp is useful as a gum in bookbinding, and fishermen employ it for paving the seams of their boats; also, since it contains much tannin, they steep their nets and lines in an infusion of it. The seeds yield an oil and the leaves have a medicinal value.

Often the tree appears as an epiphyte due to the seed being carried by monkeys, birds and fruit-bats.



DIOSPYROS EMBRYOPTERIS.

*The Persimmon.*

*(Male flowers.)*

## EUPHORBIACEÆ.

(I) ALEURITES TRILOBA. BELGAUM WALNUT or CANDLEBERRY TREE. Akhrout (*Hind.*).

The *Belgaum Walnut*, a tree of wonderful magnitude, is to be found practically all over India, though its home lies in the South Pacific Isles.

The leaves are very large, long stalked, either three or five-lobed, and while young are covered with a brown or grey velvety pile, which is very soon shed.

The male and female flowers grow together in the same clusters at the ends of the branches: they appear in March and July and are wee and white, the males far out-numbering the females.

The fruit is large, round and fleshy, olive-coloured and quite 2½ inches in diameter; it contains two or sometimes only one seed, furrowed and hard like a walnut. The kernels form an article of food tasting like walnuts, and when stuck on staves and dried, serve as substitutes for candles. When pressed they yield plenty of oil-cake and a good lamp oil called *Kekuna*, which is also used as a drying oil for paint.

The root of the tree is employed in a brown dye, peculiarly lasting.

It is a tree well suited for avenue planting, being evergreen and thriving with little or no care.

(II) PUTRANJIVA ROXBURGHII. THE CHILD LIFE TREE. Putranjiva (*Sans.*) and Jia puta or Joti (*Vern.*).



ALEURITES TRILOBA.

*The Belgaum Walnut.*

*Putranjiva Roxburghii,* the Child Life Tree (as indeed the Sanskrit part of the name denotes), is one of the most graceful of our trees and enjoys a prophylactic reputation exceeding that of any Elixir Vitae ever dispensed; for, according to the people, the hard bony seeds strung into necklaces and worn by little ones serve as amulets. It is a fairly large tree, with long drooping branches and tresses of glossy foliage breaking from the under as well as the upper sides of the sprays, and so loosely poised that they swing under pressure of every wandering breeze. Like most of its order (*Euphorbiaceæ*) the flowers of each sex keep house on separate trees, the males appearing in dense yellow groups on one, the females greenish, in twos and threes, on another. In the male flowers the calyx is 3 to 5 cleft and there are 3 stamens; in the female the calyx is 5 to 6 cleft, with a 3-celled ovary and 3 short styles dilated into triangular stigmas. The fruit is a smooth white nut, 2/3 inch long, very hard.

In the wild state, deer are chiefly responsible for spreading the seed. White ants also release them by eating the fleshy covering. In towns the dissemination is the work of fruit-bats.

The *Putranjiva* is a tree of most places in India and Burma, so widely has it been cultivated. The wood is light coloured with darker streaks, and is used for making tools, etc. The leaves serve as cattle fodder; but the value of the tree lies in its association with old customs, for in India

> "Whate'er with time hath sanction found
> Is welcome and is dear!"



PUTRANJIVA ROXBURGHII.
*The Child Life Tree.*

# INDEX.

**C**—*concld.*



**D**



**D**—*concld.*



**E**



**F**



**G**

**G**—*concld.*



**H**



**I**



**J**



**K**



**K**—*concld.*



**L**

**M**



**N**



**O**



**P**

**P**—*concld.*



**R**



**S**



**S**—*concld.*



**T**